FLIGHT

The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 577 (No. 3, Vol. XII.) JANUARY 15, 1920 [Weekly, Price 6d. Post Free, 7d.

Flight

The Aircraft Engineer and Airships

Editorial Office: 36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.

Telegrams: Truditur, Westcent, London. Telephone: Gerrard 1828.

Annual Subscription Rates, Post Free:

United Kingdom .. 28s. 2d. Abroad.. .. .. 33s. 0d.*

These rates are subject to any alteration found necessary under abnormal conditions

* *European subscriptions must be remitted in British currency*

CONTENTS

DIARY OF FORTHCOMING EVENTS.

Club Secretaries and others desirous of announcing the date of important fixtures are invited to send particulars for inclusion in the following list:

Feb. 2 ...	Meeting of Royal Geographical Society at Central Hall, Westminster, at 8.30 p.m.
Feb. 2 ...	Lecture by Capt. H. Hamshaw Thomas, M.B.E., M.A., F.R.S., before Royal Society of Arts, John Street, Adelphi, at 8 p.m.
April 18 to May 2	Seaplane Competition at Monaco
May 22 and 23	Aviation Competition at Juvisy in connection with Fêtes de Paris
June 1 ...	Air Ministry Competition (Small Type Aeroplanes), Martlesham Heath
July ...	S.B.A.C. International Aero Exhibition at Olympia
July (mid.)	Seaplane Contests at Antwerp
Aug. 1 ...	Air Ministry Competition (Seaplanes) Felixstowe
Sept. 1 ...	Air Ministry Competition (Large Type Aeroplanes), Martlesham Heath

EDITORIAL COMMENT

IN another letter to *The Times*, Mr. Holt Thomas continues his arguments for the instant announcement of a real aerial policy, and for the proper encouragement of civil aviation. He points out that, assuming Lord Fisher and others to be right in their appraisement of the future value of aircraft in war, it will one day become suddenly necessary to be able to call—for our absolute salvation—on every aircraft, engine, pilot and mechanic that we possess. In view of the present state of stagnation into which the aircraft industry has been allowed to fall, it should, he thinks, be of interest to peer into the future so as to see where, and how, this vital need can be met. The question he propounds is: How long can our aircraft-designing departments, which are expensive to maintain, go on designing aircraft for which there is no demand? Is it not reasonable to assume, in the light of present events, that when calling in emergency on those departments, it will be found that their staffs and advisers have melted entirely away?

The Future of Aerial Defence

In the matter of aero-engines it is exactly the same. If things are allowed to continue as they are, before very long it will be impossible to obtain such a thing as an aeroplane engine in this country. What a shortage of engines would mean in a sudden emergency need not be emphasised. The lessons of the War are too recent for us to have forgotten, that it was the want of engines that did more than anything else to cripple our aerial activities, and that it was not until the end was actually in sight that we had really got production on a satisfactory basis. Again, in the matter of pilots, a future emergency will find us without the men to fly the machines, even if we were able to improvise manufacture—which is very unlikely. They will be totally unprocurable unless we set out to organise at once for the future. The remedy, as FLIGHT has consistently urged, and as Mr. Holt Thomas now emphasises, is perfectly easy and obvious. The Government has simply to carry out its promises and to provide a definite sum—which need not be very large—for the design and

construction of experimental aircraft and engines in which are embodied all the lessons learnt in the Great War. Mr. Holt Thomas puts the sum at a million a year, which he thinks would be sufficient, spread over the principal designing firms, to enable the latter to retain their staffs. If such a comparatively trifling sum—which should rightly be regarded as an insurance premium—were spent on producing machines and engines to be immediately sent to the scrap-heap, it would be well expended if they were scrapped to set about the designing of something better. The essential point, as he says, is that design would be maintained.

◆ ◆ ◆

The Question of Personnel

The question of *personnel* is quite in another category. FLIGHT has urged for long enough that there is only one way in which the pilots and mechanics to fill the *cadres* of the fighting air service in case of emergency can be provided, and that is by the immediate and definite encouragement of civil aviation. Other countries are doing it. France is paying so much per kilometre commercially flown, and is, in addition, undertaking to find enough official pupils to keep recognised flying schools in a healthy condition. Germany is going all out for aerial supremacy. She already has 7,000 miles of organised aerial routes. She has established an Airmens' Union—to which we have referred more than once—to enable ex-service pilots to keep closely in touch with one another and with their old headquarters. She has also established an Air Fleet Union, analogous to the Navy League, the aims of which are to foster interest and enthusiasm regarding aerial power among the people. Even before the War, this Air Fleet Union had a membership of over a million, and it is believed to be a great deal larger now. Furthermore, she is organising a scheme of aerial propaganda in the schools, in order that the young Huns shall be fully acquainted with the possibilities of air power. And, in the meantime, what is our own Government, *pace* all its promises of "encouragement," doing to foster a vital industry and to create and maintain the essential public interest in aviation? Very little indeed that appears. As we have more than once said, the Government seems to be groping in the dark for a policy, what time progress is at a standstill, and the industry goes from bad to worse, so far as the construction of aircraft is concerned. It is not that the industry wants charity. It does not, for it has plenty of business to keep it occupied in other directions. Mr. Holt Thomas himself observes that, in order to make money for his own shareholders, it is quite unnecessary to construct new aircraft, as his company's factories are engaged in work of another kind, for which there is a great demand. That is to say, it matters nothing, from the purely business point of view, whether the Government has or has not an aerial policy. It is not orders for new aeroplanes the industry wants, except that those who have pioneered it and have seen the country and its Allies through the dark days of the War, are better able than most to realise what the maintenance of our aerial supremacy means to the country and the Empire. It is not a matter of pounds, shillings and pence at all. These men realise well that war in the air will be a very terrible thing when it comes, and that the country which neglects to prepare now must go down before the onslaught of a powerful opponent whose vision has been clearer. They know that aviation is a very different thing to what it was in 1914, when it was still in swaddling clothes and was, from the military point of view, merely a side-show and an accessory. Today it has become a decisive factor in war. Given a blow struck suddenly and of full weight, there need be no setting in motion of armies or fleets—the whole fate of a great nation will have been decided by the first terrific blow from the air. Are we to "wait and see" until it is perhaps too late, or are the Government going to redeem their stated policy and tell us what they intend to do to keep alive an industry upon which the fate of the whole Empire may one day depend? Let us at least know where we stand in this matter.

◆ ◆ ◆

Why Not Air Scouts?

In another article we have called attention to the action of Germany in beginning air propaganda in the elementary schools. There are some directions in which we can profit even by the example of our late enemy, and here, we think, is one. If the future generation is to fully appreciate all that is bound up in air power, we must begin its education early, since even by the generation which has but just come through a great war, the real meaning of air power is imperfectly understood. Germany knows this, and is taking the necessary steps to educate its rising generation in all that is meant by supremacy in the aerial arm. We should like very much to see the same sort of propaganda work carried out here, but we fear there is little hope of securing official recognition for such commonsense procedure. There is not a great deal to be expected in a country in which it is not officially permitted to fly the national flag over elementary schools on such an anniversary as Empire Day!

There being, as we have said, very little hope of an official lead, it must remain for private enterprise to fill the gap. Apropos, we have received a letter from a valued correspondent, who does not wish to have his name mentioned, in which he advocates the formation of a body of "Air Scouts." After pointing to the splendid work which has been done in connection with the Boy Scouts organisation, and also by the "Sea Scouts," he goes on to say: "Now that the Air Force has taken its proper place among the fighting Services of the Crown, it is not too much to expect, I hope, to see an Air Scout organisation formed in the near future; the objects of such an organisation being to foster the "air spirit," and to bring up the youth of the nation in the traditions of the R.A.F. Incidentally, model aeroplane competitions should prove to be a great stimulus in training."

The idea seems to us to be altogether admirable in its conception. It remains now for some senior officer of the R.A.F. to enact the *rôle* which has been so ably filled by Sir R. Baden-Powell in the organisation of the Boy Scouts. We need not dilate upon the need which exists for educating our youth in the overwhelming importance of air power to the Empire. That is too obvious to require more than merely stating to point the need for such an organisation as that suggested by our correspondent.

◆ ◆ ◆

The Cairo-Cape Air Route

In a recent issue of *The Times* a correspondent discusses the possibilities of the air route from Cairo to the Cape, and points out some of the climatic difficulties which will have to be encountered in

OVER THE ALPS, GLIDING INTO THE VALLEY : A photograph of a Swiss " D.H. 5 " taken from another machine by Lieut. Mittelholzer

working the services. He divides the route into zones. The first, extending from Cairo to Khartoum, is practically rainless throughout the year and the conditions are almost ideal for flying. From Khartoum, down the valley of the White Nile to the northern shores of the Victoria Nyanza, is a region of well-marked wet and dry seasons. This zone presents no particular difficulty. From slightly north of the equator to Lat. 12 degrees S. lies the region of the great lakes, and it is in this belt that the worst flying weather is encountered. On the Victoria Nyanza rain falls all the year round, and is often accompanied by violent thunderstorms and waterspouts which travel with great velocity. The atmosphere is damp and humid, and it is in this district that the greatest difficulty has been encountered in finding sites for aerodromes. The combination of heat and moisture causes the vegetation to grow rapidly and the country is one vast, steaming jungle. In the country surrounding Lakes Tanganyika and Kivu the weather is always uncertain. Thunderstorms arise almost without warning, though it should be possible to avoid them by climbing to seven or eight thousand feet. The whole of this district is apt to be shrouded in morning mists, though these disappear rapidly under the influence of the tropical sun. The climate has a very bad effect on timber, the extreme heat and damp causing joints to " give " and the timber to rot. This is especially the case with aircraft propellers. The glue between the laminations loses its adhesiveness and the propeller falls to pieces.

From the twelfth parallel S. to the twentieth the seasons become sharply divided. The climate is favourable, with a rainy season extending from November to December and from March to May. The most southern belt, from the centre of Rhodesia to the Cape, offers very little difficulty to the aerial traveller in so far as weather conditions are concerned. The weather difficulties are concentrated in the central zones, and it is in these also that the ground difficulties are worst in case of a forced landing. To sum up the conclusions, the best time of year for a pioneer flight is between December and March. From the latter month onwards the central zones become practically impossible, at any rate, with the present ground organisation. To make all-the-year-round navigation possible, a much more elaborate ground organisation will have to be instituted, including a system of weather reports and rapid communications, preferably by wireless. It is just as well that the difficulties should be known and faced. They are great, but by no means insuperable, and to recognise them is to have gone a long way towards defeating them. That they will be overcome in the very near future is certain, we are confident, and that before very long we shall see a regular Cape-Cairo air service in being.

◈ ◈ ◈ ◈

TAKE A LESSON FROM THE HUN.

(Germany's idea is to rehabilitate herself by becoming a great Aerial Power.)

WINSTON CHURCHILL: **"You've handed over all your 'planes?"**
THE OTHER: **"Yah!"**
WINSTON: **"But what have we in this enormous hangar?"**
THE OTHER: **"Ach! ve must** *live!* **"**

BY THE TECHNICAL EDITOR

(*Continued from page* 46)

de Marçay (*continued*)

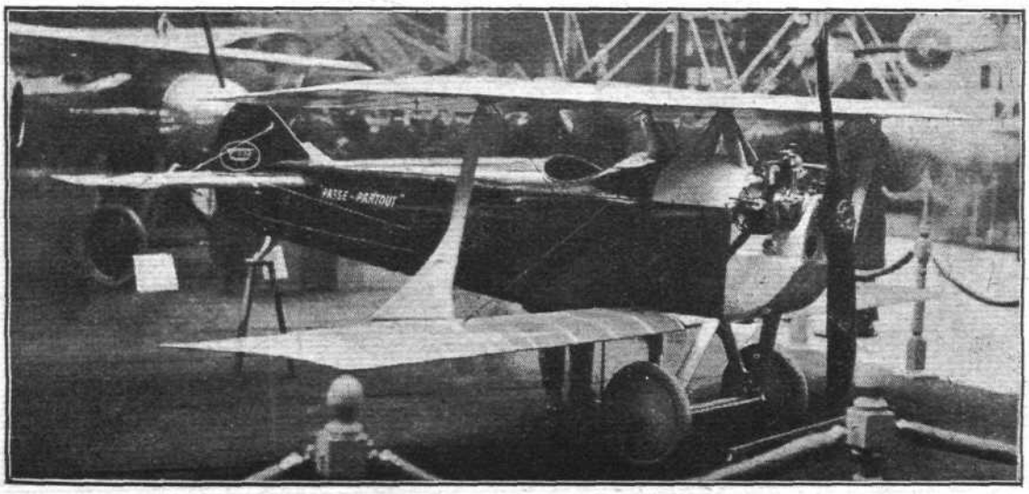
THE smallest of the de Marçay machines is known as the "Passe-Partout." As already mentioned in our preliminary report on the show this machine has an engine of 10 h.p. only—a British A.B.C. two-cylinder opposed air-cooled. From the table of particulars published in our issue of January 1 it will be seen that the loading per horse-power is very heavy, 41·7 lb., and one, therefore, somewhat doubts the practical utility of the machine, as there would appear to be no reserve power for climbing. In several respects, however, the machine is very interesting, and with an engine of about 20 h.p. and slightly larger wings to keep down the landing speed, should prove a very serviceable little 'bus.

As in the case of the other two de Marçay machines, the *fuselage* is of *monocoque* construction, but the section is rounded rectangular rather than circular. The A.B.C. engine is mounted above the nose of the *fuselage*, presumably to get the propeller shaft as high as possible so as to allow of getting sufficient propeller clearance. It would be possible to cover in the upper part of the engine, but on the machine shown this had not been done. The main planes are straight without dihedral, and the bracing is of the simplest possible type, one lift cable and one anti-lift cable. Lateral control is by warping the upper plane. To allow of doing this the interplane struts, of which there is one on each side, are tapered towards the top while they are wide at the bottom so as to reach both lower spars. The warp cables pass from front and rear top spars down over pulleys in the bottom plane and hence to the control lever. This would appear to be quite a neat way of arranging the lateral control in a small machine, as the fitting of *ailerons* entails a considerable amount of extra work, and also adds somewhat to the weight.

The tail plane, as on the other machines on this stand, is of the lifting type, and is covered with three-ply wood. The elevators are fabric-covered, but both fin and rudder are covered with ply wood. The tall skid is very simple and neat, consisting of a laminated spring of wood. A diminutive vee under-carriage, with rubber shock-absorbers, is fitted.

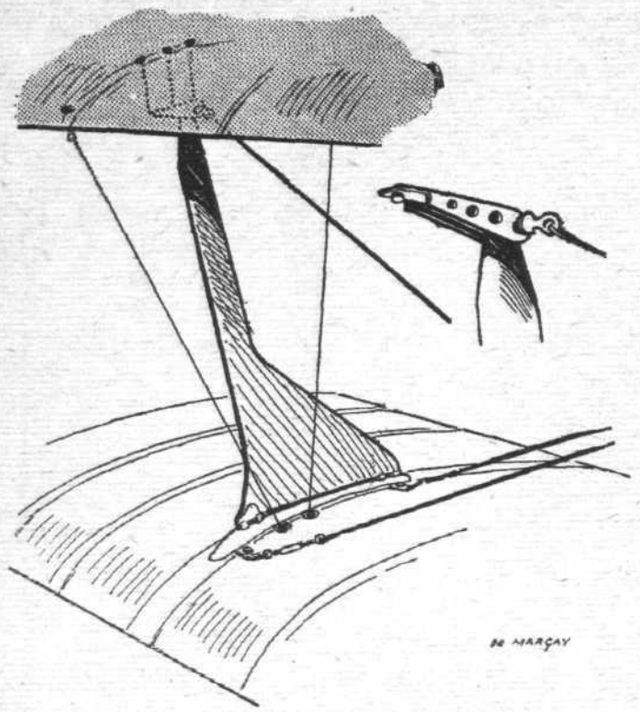
Messageries Aériennes

This firm, who handle the Paris end of the Handley Page London–Paris air service, and whose machines have been alternating with the H.P.s on the London–Paris route, were showing in the gallery a Breguet *fuselage* of the latest passenger cabin pattern. The cabin was beautifully finished, with comfortable seats and upholstery. One of the front seats was of the collapsible type, so as to permit of access to a small mail or luggage compartment in front of the cabin, between it and the engine-room. Everything was extremely well thought-out, and, although smaller, the Breguet machines of this type will form a good complement to the larger Handley Page machines. This firm also exhibited a number of panels of routes which it is proposed to open during the coming year. One of these was to Dakar. Other routes



The de Marçay "Passe-Partout": This is the smallest machine at the Paris Show, and is fitted with an A.B.C. engine of 10 h.p. only.

"Flight" Copyright



"Flight" Copyright

THE DE MARÇAY "PASSE-PARTOUT": Sketch showing method of warping top plane for lateral control.

of shorter distance were to Amsterdam, Casablanca, Seville, Brindisi, and Athens.

Morane-Saulnier

With the exception of one machine exhibited by L. Clement, the representation of the monoplane type of machine was left to Messrs. Morane-Saulnier, who exhibited no less than three complete monoplanes, all of the parasol type. In many ways it seems a pity that the monoplane has been so effectively killed by the War, since for small sporting machines, at any rate, the type has many things to recommend it. Thus, in the case of the parasol monoplane, a better view is obtained in all directions than is possible with any other combination. If the cantilever type of wing is employed there is no bracing, rigging, or trueing-up to attend to, and it would be a simple matter so to design the wing attachment that, for housing purposes, or for transport along a road, the wing could be pivoted so as to lie parallel to the *fuselage*, the necessary attachments being so designed that the operation of placing the wing ready for flight would occupy a few minutes only.

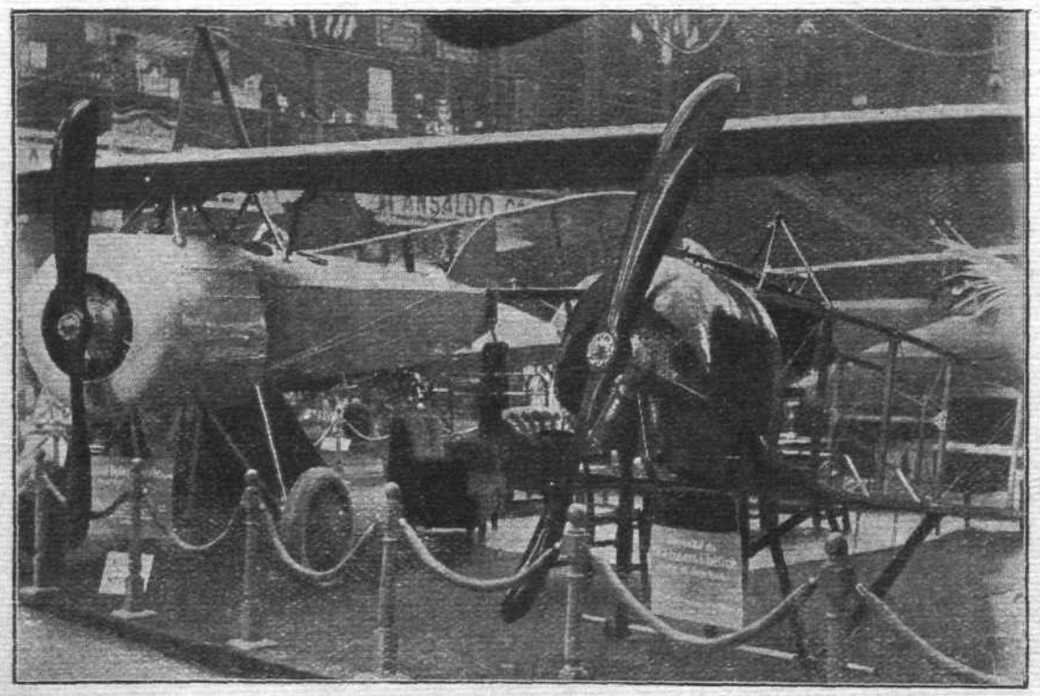
Although this feature had not been taken advantage of in any of the Morane-Saulnier machines shown, we think the firm deserves credit for making themselves champions of the monoplane, as we feel sure that the last has by no means been heard of this type for small sporting machines.

In a way, it may be said that Messrs. Morane-Saulnier have taken up the thread where they left it before the War, for it may be renmembered that at the Paris Aero Show of 1913 this firm exhibited among other machines a parasol monoplane, very similar to those shown this year.

In a general way the three monoplanes exhibited were of very similar design, the only real differences being as regards the form of wing bracing and in the matter of seating arrangements. If, therefore, we take the type AR and describe it in detail, pointing out wherein the other machines differ, the general design and construction of all three machines will be understood. According to the makers, the Morane-Saulnier type AR has been designed for *Tourisme*. It is a two-seater, with two separate cockpits arranged in tandem, and the power plant is an 80 h.p. Le Rhone. Generally speaking, there is a good deal of similarity between this machine and the pre-War Moranes, of which several were flown at Hendon in 1914, a number of them being built under licence by the Grahame-White Co. There is this difference, however, that whereas the older machines were of the ordinary type, the new ones are all parasols.

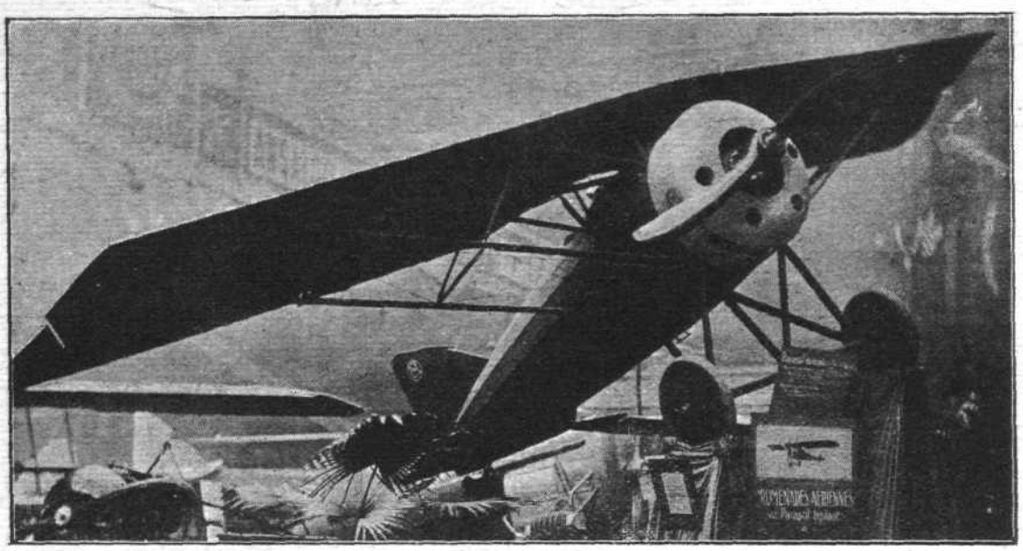
The wing bracing differs considerably from that of the earlier models. Instead of the two inverted Vees supporting the front spar and one inverted Vee under the rear spar, with a three-legged *cabane* above the wing for the anti-lift bracing, the modern Morane-Saulnier type AR has for the support of its front spars a four-legged pyramid of steel tubes, and for the rear spar a simple inverted Vee. The top *cabane* consists of a single inverted Vee of wood, placed on the centre line of the wing. The whole wing is, therefore, more or less hinged around a central longitudinal axis, and is held in position by the cable bracing only. Constructionally the wings are of standard type, with spars and ribs of wood. The *ailerons*—which have now supplanted the warping wings of the older models—are built of duralumin tube throughout. Each *aileron* is carried on three hinges, mounted on an auxiliary spar placed some little distance behind the rear main spar. The *aileron* carries a crank, linked to another crank on the main control tube by a short horizontal tube. The main control tube runs along the rear spar, and terminates at its inner end in a crank from which a tube runs down to the controls. The wing bracing is in the form of piano-wire, both above and below the wings.

The *fuselage* construction is, in the main, similar to that of the older types, with the exception that in the modern machines the struts are placed with their ends on the *longerons* and not secured by bolts through strut and *longeron*, as were those of the pre-War machines. Also, instead of the horizontal knife-edge which characterised the old Moranes, the new machines have a vertical stern post, and are, in



On the Morane-Saulnier Stand: On the left the M.S. two-seater, type AR. On the right the nose of a pre-War type Morane monoplane, fitted with interrupter gear.

"Flight" Copyright



The Morane-Saulnier type A 1, with tubular wing bracing

"Flight" Copyright

addition, provided with a fin. One, therefore, has much more faith in the directional stability of the modern version. The undercarriage remains much as of old, with only minor alterations to the apices of the Vees.

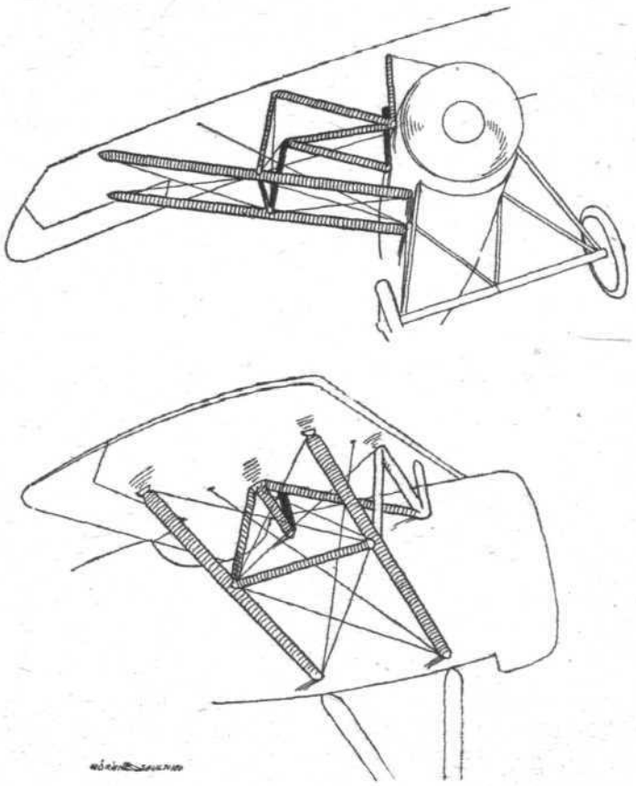
The Morane-Saulnier type AS is similar to the AR, except that it is of slightly smaller dimensions, is a single-seater, and has its wings slightly swept back in order to enable the pilot to be seated behind the rear spar instead of under the wing, as is usually necessary with single-seater monoplanes having light rotary or radial engines.

The third monoplane shown had a more powerful engine—110 or 180 h.p. Le Rhone as desired—and its *fuselage* was streamlined. The wing bracing of this machine was in the form of sloping tubes, acting as tension members in ordinary flight, and as compression struts when the machine is upside down or resting on the ground. Although doing away with the top bracing, this structure looks somewhat clumsy, and can hardly fail to offer a considerable amount of wind resistance.

Finally, there was shown on the Morane-Saulnier stand the *fuselage* of an M.S. two-seater fighter biplane. This machine has a *monocoque* body, with wing roots built integral as in some German machines. The pilot sits just behind the top centre section, and is armed with two synchronised machine guns. The gunner's cockpit is immediately behind that of the pilot, and has a gun-ring with two machine guns. There is further a small gun tunnel in the floor of the *fuselage*, through which the rear gunner is able to fire in a downward and rearward direction. The engine of this machine was a Liberty 400 h.p., the only one at the show.

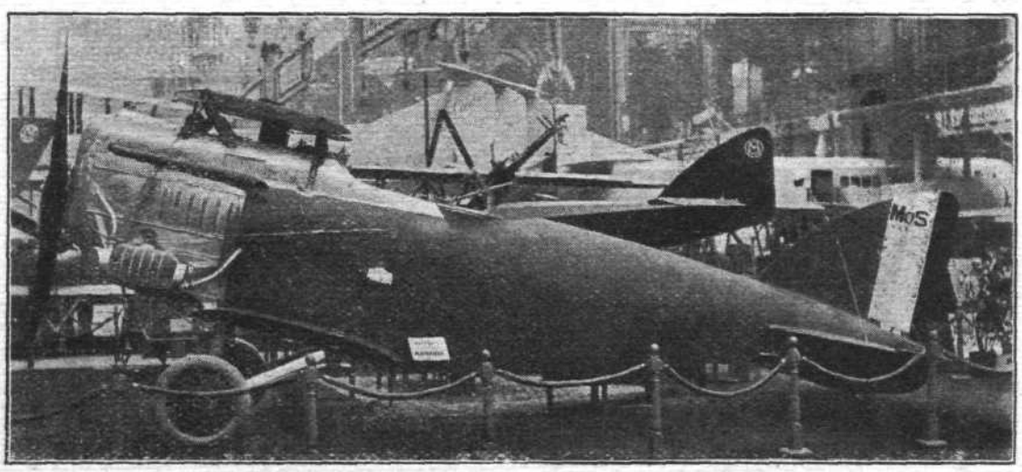
The Nieuport Machines

On the opening day of the Paris Aero Show there were exhibited on the Nieuport stand three complete machines, all biplanes. During the night, however, one of these disappeared. Enquiries elicited the information that the machine—the small racer on which M. Sadi Lecointe had established a speed record of slightly over 190 m.p.h.—had been taken to the Nieuport aerodrome, as M. Lecointe was after more records. Thus the majority of visitors to the



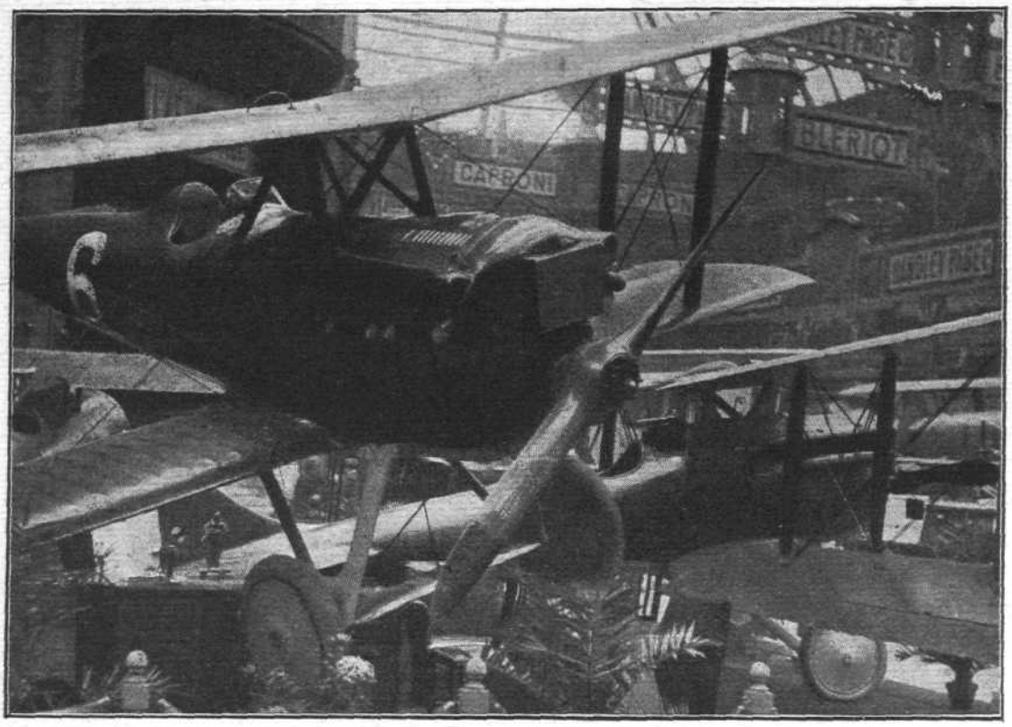
"Flight" Copyright

Two sketches of the strut bracing on the Morane-Saulnier parasol monoplane.



The *fuselage* of the Morane-Saulnier two-seater fighter biplane

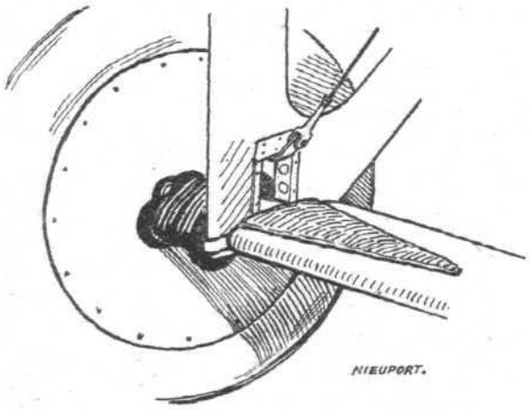
"Flight" Copyright



The Nieuport racer, 300 h.p. Hispano - Suiza engine, on which M. Sadi Lecointe did a speed of over 190 m.p.h.

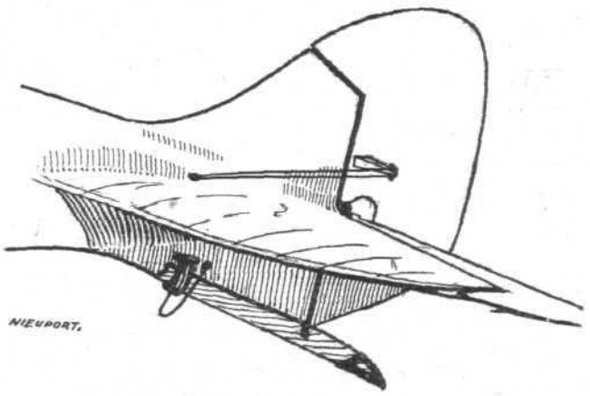
"Flight" Copyright

exhibition were deprived of the opportunity of seeing this record-breaking machine. The FLIGHT photographer was, however, fortunate enough to secure, before its removal, a picture of the machine mounted in the manner beloved by French constructors so as to give the appearance of being on a banked turn. The Nieuport racer is of quite diminutive size, considering her powerful engine. The *fuselage* is of *monocoque* construction and well streamlined. Generally speaking, the machine is very similar to that flown by Lieut. Casale at the time of the Schneider race at Bournemouth. The 300 h.p. Hispano-Suiza engine is entirely covered in, and there is a small radiator—less than a foot square—in the nose. Another radiator of the Lamblin type is mounted between the port undercarriage struts. In other respects there is nothing out of the usual about the racer; it is merely a small machine, carefully stream-lined to get the best possible speed out of it. The machine carries fuel for one hour only.



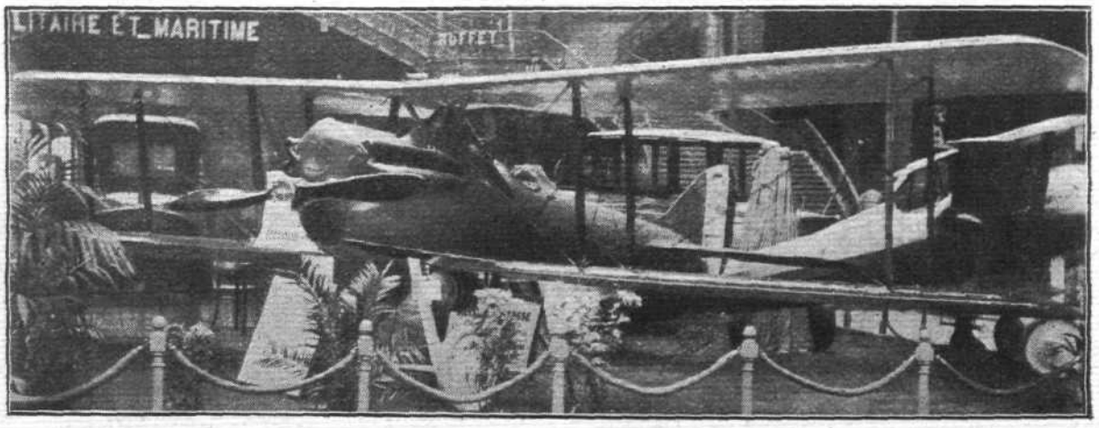
"Flight" Copyright

A NIEUPORT CHASSIS DETAIL : The hinged, divided axle is covered near the Vee by a triangular piece of elastic.



"Flight" Copyright

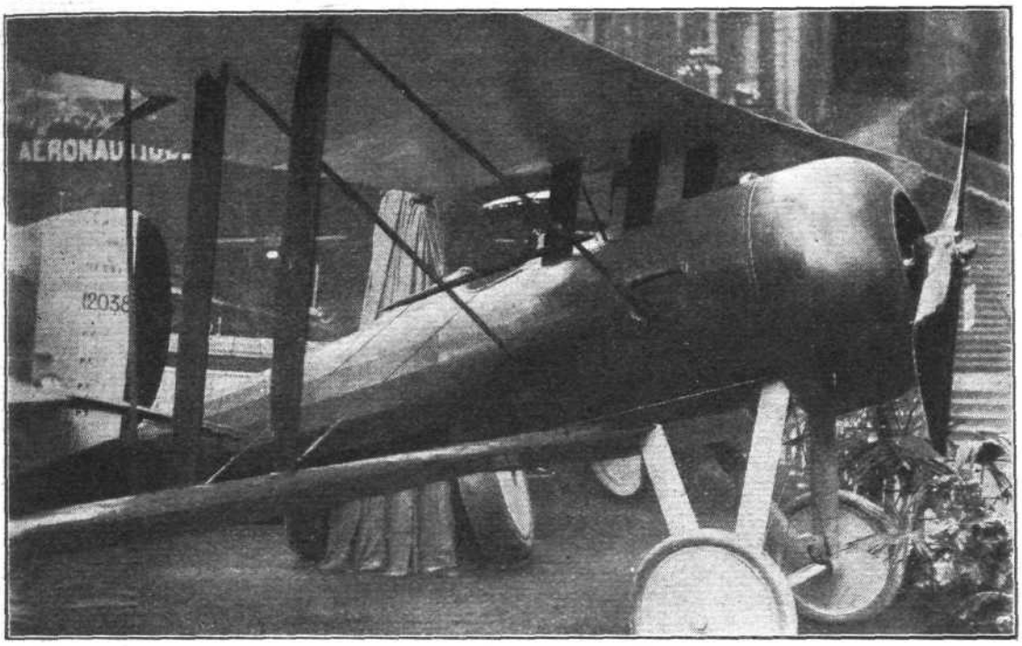
The tail of the Nieuport biplane is covered with three ply wood, continued outwards from the *fuselage*.



The Nieuport single-seater fighter, type 29 C 1

"Flight" Copyright

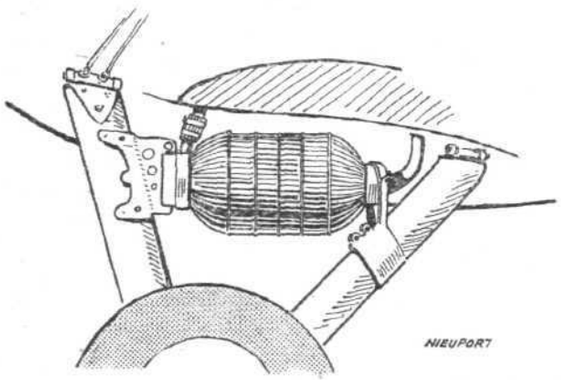
FLIGHT
The Aeroplane & Engineer
Airships



The Nieuport single-seater sporting biplane, 180 h.p. Le Rhone engine

" Flight " Copyright

The second machine shown by Nieuports, the type 29 C 1, is of very similar design to the racer, but is a considerably larger machine. The *fuselage* is of the usual *monocoque*



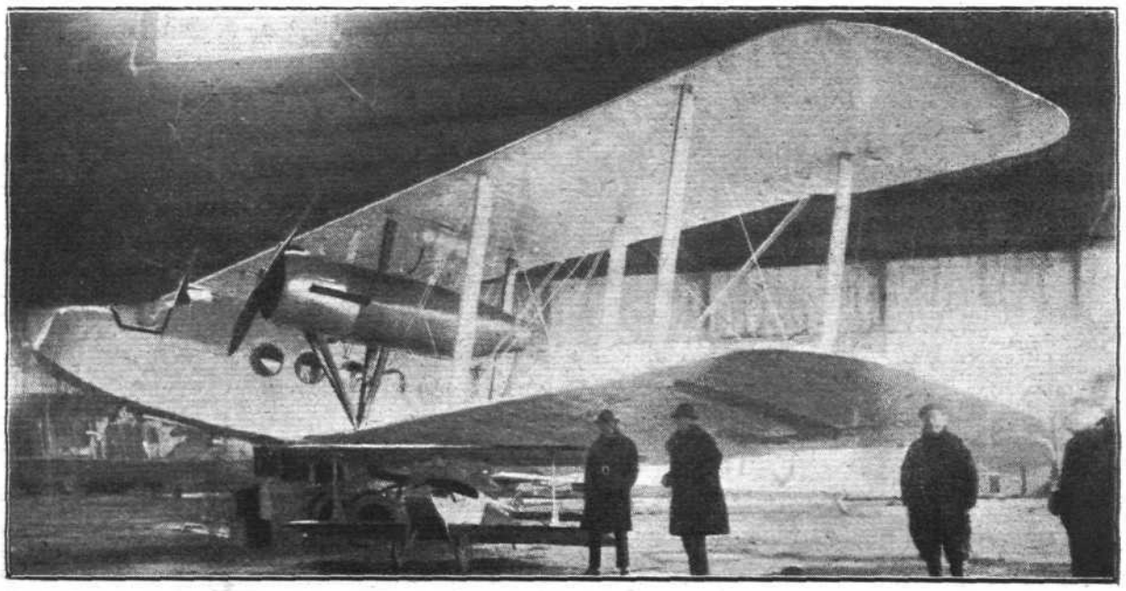
" Flight " Copyright

The " Lobster pot " radiator (Lamblin) on one of the Nieuport biplanes

type, with tail plane and vertical fin built integral with the body and covered with three-ply wood. The 300 h.p. Hispano-Suiza engine is covered in as in the racer, but there is no nose radiator. The cooling is accomplished by means of two Lamblin radiators, mounted between the struts of the undercarriage, as shown in one of our sketches. In the nose of the *fuselage* there is a small square of gauze, behind which is a funnel or duct of aluminium which serves to ventilate the engine-room. The main planes have two pairs of wood struts on each side, and the bracing is by stream-line wire. *Ailerons* are fitted to the bottom plane only. The undercarriage consists of two simple Vees in wood, with a stream-line fairing over the divided axle. A short triangular-shaped piece of elastic is stretched over the opening for the axle, so as to maintain the covering of the casing when the machine is flying, while allowing of the travel of the axle while landing and getting off.

The exhibits on the Nieuport stand, as regards aeroplanes—there were several motor-boats—were completed by a single-seater sporting machine, type 28, with 180 h.p. Le Rhone engine. Constructionally the type 28 differs from the other machines in that it has a stream-line, but not *monocoque* body. In front the *fuselage* is of circular section, covered with three-ply wood. The rear portion is of polygonal section and is fabric-covered. One pair of inter-plane struts on each side connect the main planes, of which the bottom is straight while the top plane has a dihedral angle. The bracing is in the form of cables, the lift being in duplicate. A fairing of wood is interposed between duplicate cables. There are four *ailerons*, of which the bottom pair is operated by tubes inside the wing, and connected up to the top *ailerons*

A study in contrasts: The little 10 h.p. de Marçay " Passe-Partout " standing under the wings of the Handley Page W 8 at Le Bourget Aerodrome



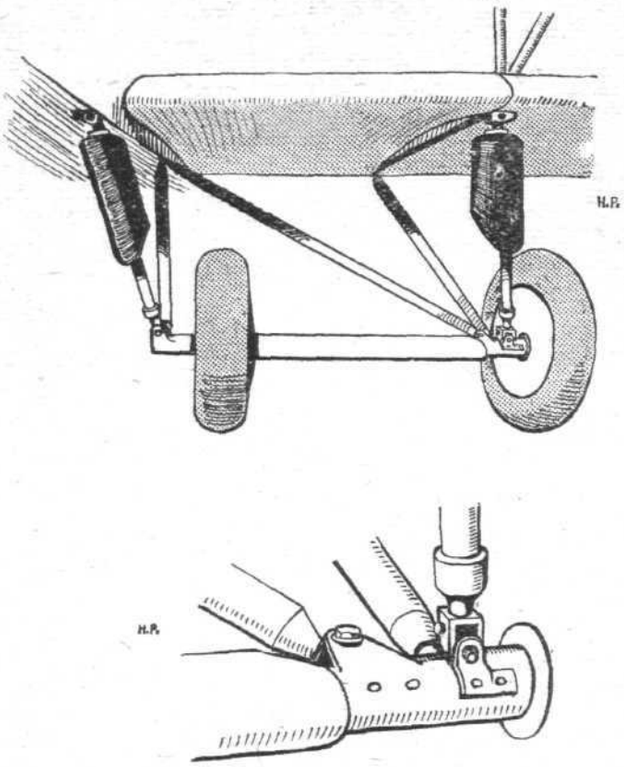
by elliptical section tubes. The machine presented no unusual features, and calls for no comment.

The Handley Page W 8

Particulars of the new Handley Page, W 8, have already been published in previous issues of FLIGHT, and it may now be added that in the large machine class the machine was one of the most admired at the show. The French President appears to have shared this opinion, for the W 8 was the first large machine into which he entered. From an engineering point of view certainly the Handley Page can more than hold its own against any of the other large machines exhibited. The cabin has been extremely well arranged, the *fuselage* structure having been so designed as to avoid the transverse bracing which somewhat marred the comfort of the converted machines. There are 15 seats inside the cabin, the odd number being due to the door in the port side, which occupies the space of one seat. Should any passenger feel the need for a few minutes' seclusion during the journey, there is a small compartment for this purpose immediately aft of the main cabin and connected with it by a door. The pilot and a mechanic are seated in an open cockpit in front, and between this and the main cabin is a luggage compartment, for, of course, passengers on a modern Handley Page are not expected to restrict their luggage to a tooth-brush.

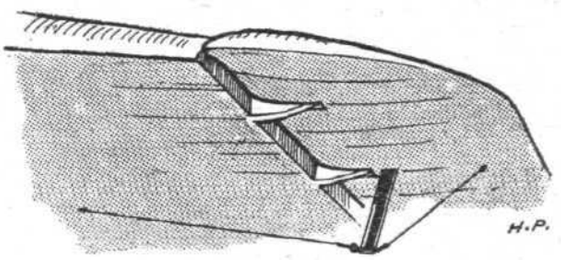
The main planes are of approximately rectangular plan form, with the corners rounded off. In addition to the engine struts, there are two pairs of apruce struts on each side. The bracing is by streamline wire. *Ailerons* are fitted to top and bottom planes, the method of balancing them being indicated in one of the accompanying sketches. An interesting feature of the H.P. W 8 is its undercarriages, which are now of a very simple form, as shown in the sketch. There are two simple Vees of steel tube, one Vee being anchored at the top to the *fuselage*, the other to the bottom plane where occurs the engine mounting. There are two wheels to each undercarriage, each being placed on the outside of its Vee. Transverse bracing is by a diagonal tube, the system including universal joints to allow of unequal travel of the two wheels. The whole structure looks very simple for such a large machine, and would appear to have a very low resistance. The shock-absorbers are contained in the casings on the front vertical struts.

Mounted comparatively high in the wing gap are the two Napier Lion engines, which are enclosed in streamline engine *nacelles* with nose radiators. The fuel tanks, which hold



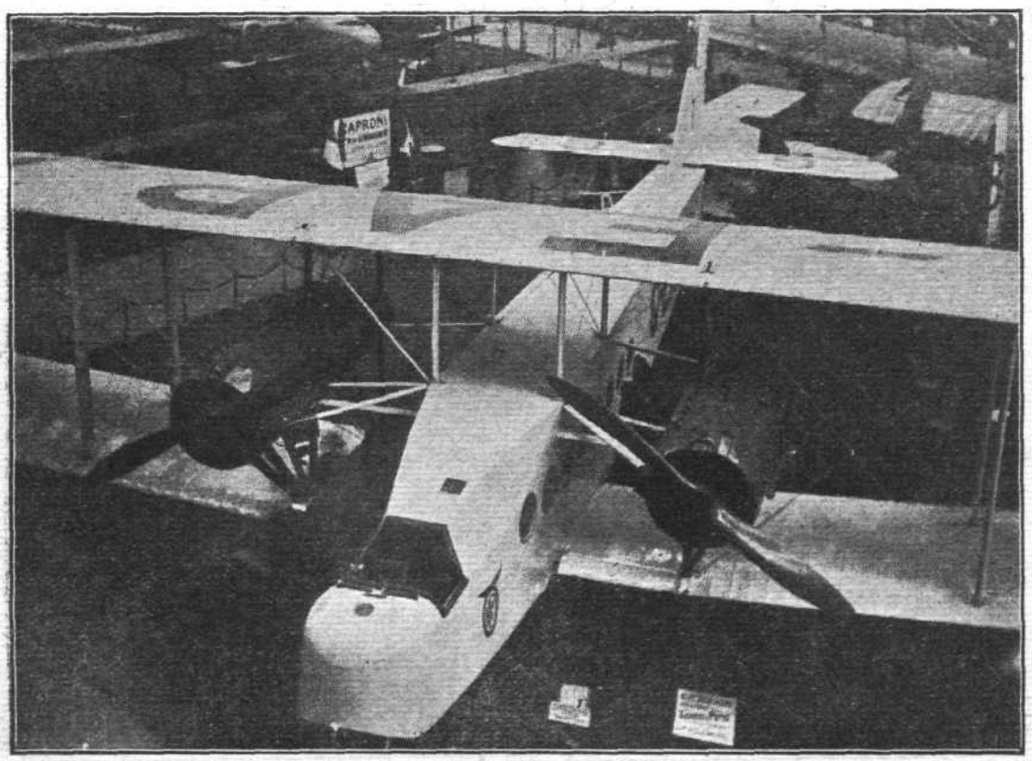
"Flight" Copyright

THE HANDLEY PAGE W 8: Sketch of one of the undercarriages, and details of the universal joints



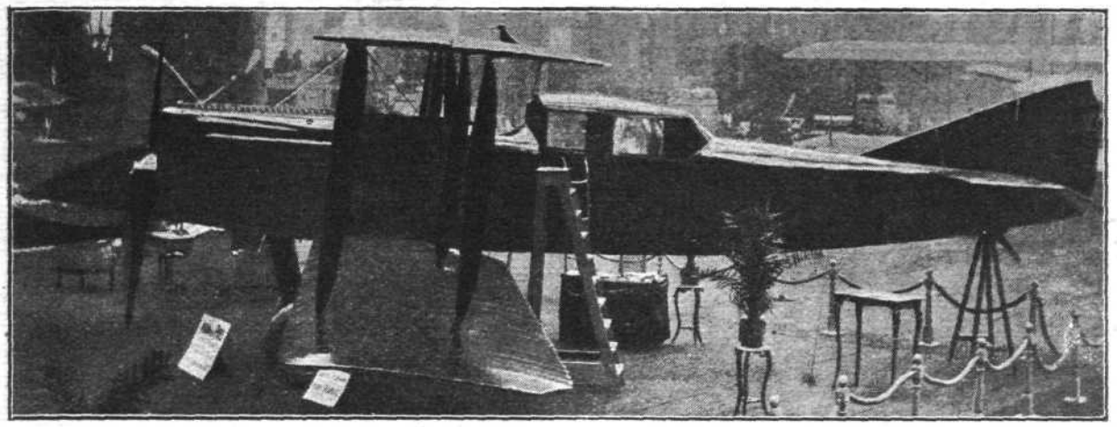
"Flight" Copyright

ON THE HANDLEY PAGE W 8: Method of balancing *ailerons*



The Handley Page, seen from above: In the large machine class, this was probably the finest all-round cabin 'bus in the exhibition

"Flight" Copyright



The Henry Potez limousine

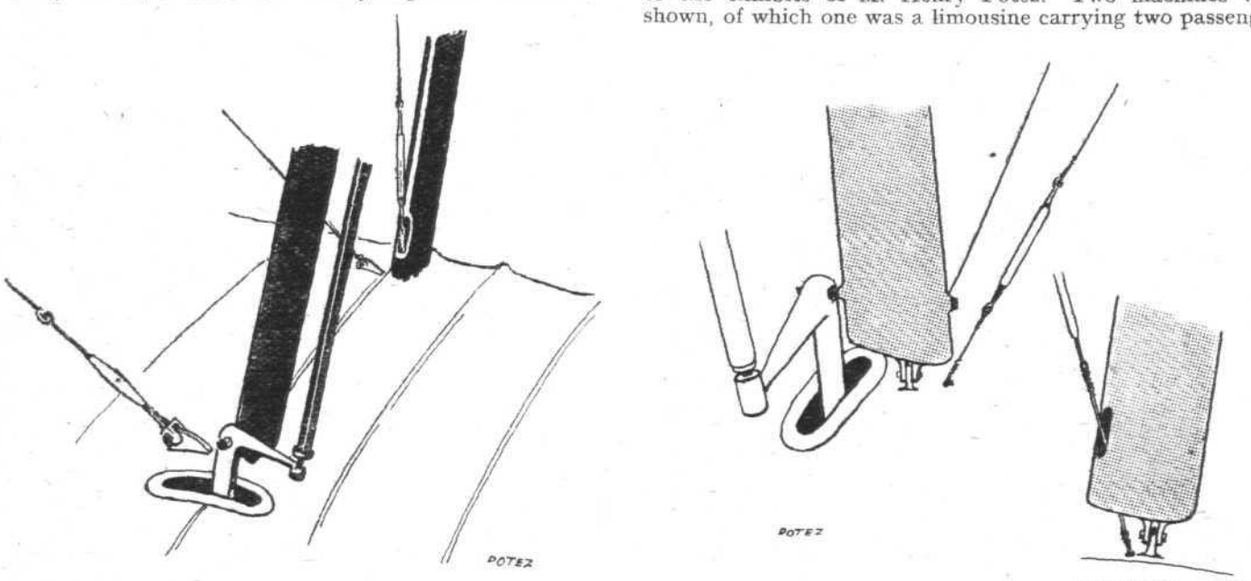
"Flight" Copyright

sufficient for a flight of 6½ hours' duration, are placed behind the engines, and there is thus no petrol in the main *fuselage*.

It might be mentioned that the Handley Page made the journey from London to Paris in an actual flying time of 1 hour 50 mins., which fact naturally impressed visitors considerably. The maximum speed of the machine is about 112 m.p.h., with a normal cruising speed of about 90 m.p.h. It is said that the machine is able to fly on one engine only (when that engine is developing its full power, of course), when the speed is 75 m.p.h.

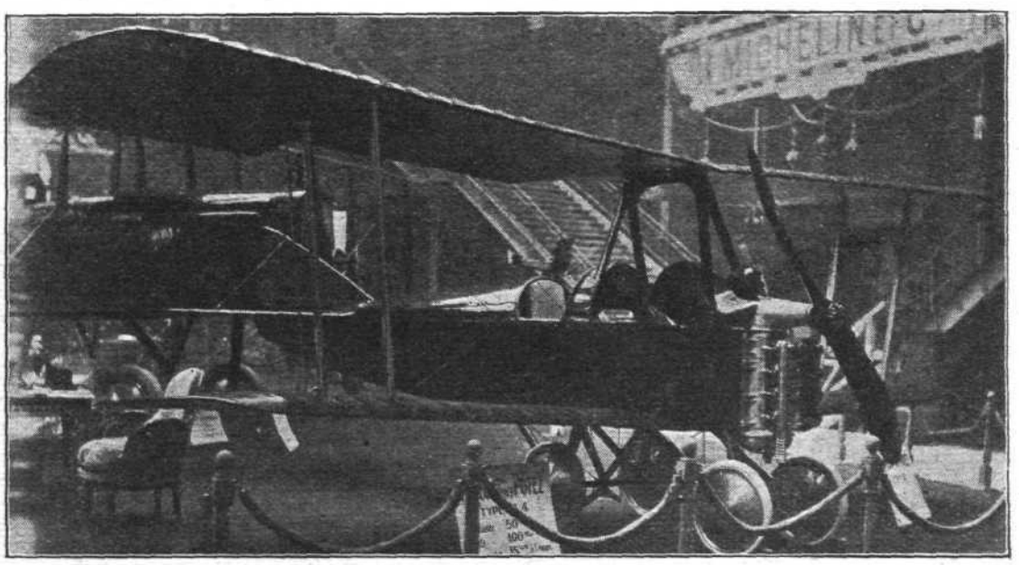
The Henry Potez Machines

As a newcomer in the aviation industry, and as an unknown quantity as far as the majority of the foreign visitors to the show were concerned, considerable interest attached to the exhibits of M. Henry Potez. Two machines were shown, of which one was a limousine carrying two passengers in addition to the pilot. The limousine—type SEA VII—is a development of the Potez military machines, the general outline of which it maintains, with the exception of the "hump" formed by the coupé, and of a slightly greater wing area to allow of a lower landing speed. The pilot



"Flight" Coppright

SOME HENRY POTEZ DETAILS: The *ailerons* are operated *via* L crank levers. Note the simple strut attachment.

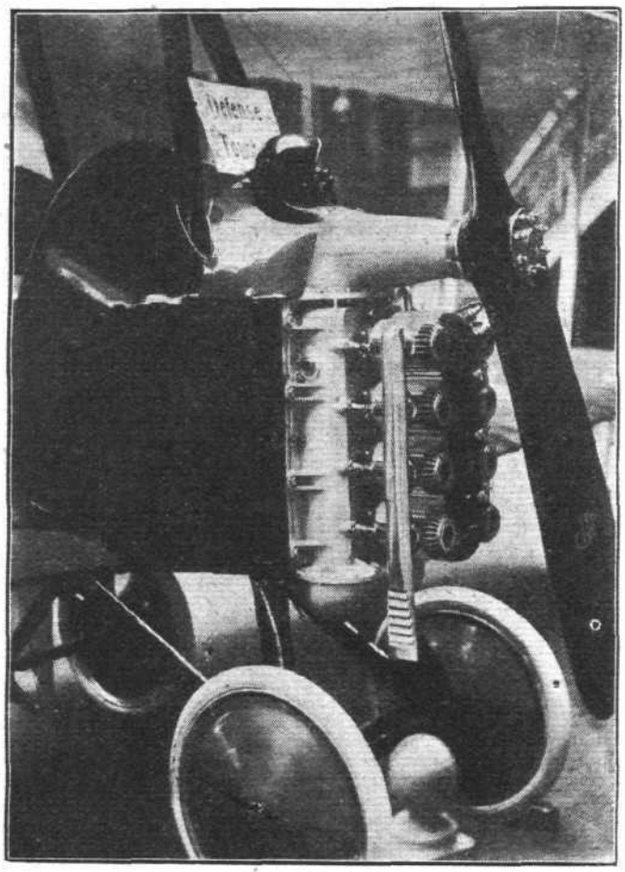


The Henry Potez type VIII: This machine has its engine mounted with the crankshaft vertical, and the drive to the propeller is through a bevel reduction gear

"Flight" Copyright

sits in the open, in front of the cabin, while the two passengers sit facing one another inside, there being a low partition between them, which does not, however, extend right up to the roof of the coupé, and which has a small door. The object of this partition is probably to form a transverse bulkhead in this part of the *fuselage*. The engine fitted is a Lorraine-Dietrich of 400 h.p., and the speed is in the neighbourhood of 125 m.p.h. The machine is of more or less orthodox design, and presents no unusual features.

The second Potez machine, the type VIII, on the other hand, has several unusual features. First of all, it is constructed to a large extent of metal (duralumin) as regards its wing structure. The *fuselage* is, however, built of wooden *longerons* and struts, covered with three-ply. Secondly, the mounting of the engine is very unusual, the crankshaft being placed vertical and driving the airscrew shaft through bevel reduction gearing. This results in a very low position of the *fuselage* while retaining the usual position of the centre of thrust. The consequence is that the body is very easy to get into and out of, while the height of the undercarraige struts is reduced to a minimum. The design also encourages the use of a four-wheeled undercarriage, as the nose is very low over the ground, and such a type of chassis has, in fact, been employed. The main wheels are placed farther aft than usual, behind the centre of gravity, so that even when the machine is alighting at the angle of maximum lift there is only a small load on the tail skid, and consequently the *fuselage* is not subjected to such severe shocks as in the case of machines with their wheels in front of the centre of gravity. The front wheels, placed as they are immediately under the engine, effectively prevent the machine from turning over on her nose, and in actual use will probably be found to save many a propeller, to say nothing of worse damage.

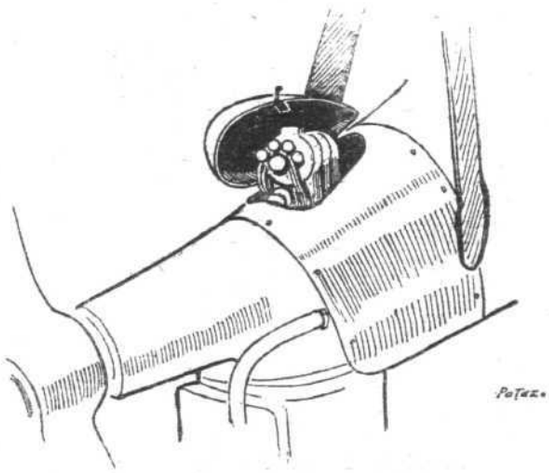


"Flight" Copyright

THE HENRY POTEZ TYPE VIII: Close-up view of the engine, a Henry Potez four-cylindered air-cooled. Note the accessibility of all engine parts and accessories

The 50 h.p. Potez engine is of the four-cylindered vertical type, air-cooled, and is, as already mentioned, placed with its crankshaft vertical. By this means it is hoped to ensure even cooling of the cylinders. From the point of view of running this arrangement of the engine would appear to be very good, as not only is the engine lower over the ground, but also all the different parts which may require attention are easily accessible, as will be seen from the accompanying illustrations. Also from the pilot's point of view this arrangement of the engine is excellent. As the nose of the *fuselage* is low, and is furthermore very narrow, the engine and its housing interferes with the view to a very small extent only. Taking it all round, there appears to be a number of not inconsiderable advantages in arranging the engine as in the H. Potez Type VIII.

The wing construction is the part which we like least. It is entirely in duralumin, which fact in itself will be against the machine owing to the expense, the cost of duralumin being several times that of steel. Further, the design is not what one would expect in a modern machine. The wing spars are of plain channel section, which is not an economic form of construction, it being impossible to develop the full strength of the material. The rib construction also impresses one as being weak, although it is probably better than the spars.



"Flight" Copyright

THE HENRY POTEZ TYPE VIII: Sketch showing neat cover over magneto. The engine is placed with its crankshaft vertical

Ailerons are fitted to top plane only. They are operated by horizontal tubes inside bottom plane, attached to L-cranks at the foot of the rear inter-plane struts. From these cranks tubes run up to the *ailerons* in the top plane. The inter-plane struts themselves are of duralumin, streamlined, and the attachment is very simple, as shown in one of our sketches. Altogether there are many excellent points about the Potez Type VIII, although certain points are open to criticism, and we trust that this newcomer to the aviation world has come to stay.

(To be continued.)

◈ ◈

Civil Flying in India.

The regulations under which civilian flying in India will be permitted have now been issued, and they follow very much on the lines of those which are in force in this country. Flying machines must give way to airships, and airships to balloons, whether fixed or free.

The Bombay-Karachi Mail Service

ALTHOUGH it was originally announced that the aerial mail service between Bombay and Karachi would start on January 1, later advices from Bombay indicate that it would not be possible to commence operations before January 17.

At first, owing to the absence of an intermediate aerodrome, seaplanes will be used.

◈ ◈

Another Flight to Australia

LIEUT. H. PARER and Lieut. J. McIntosh, two Australian flying officers, left Hounslow at 10.30 on the morning of January 9 on a D.H. 9 aeroplane for Australia.

The flight is in the nature of a private sporting attempt, and the officers have on board a present for the Premier of New South Wales.

Two Aerodromes in Holland

THE interest aroused by the Aero Exhibition in Amsterdam appears to be likely to have good results for aviation, as it is announced that two large internationai aerodromes are to be constructed by the Government in Amsterdam and The Hague respectively, at a cost of over £166,000.

AIR MINISTRY TESTS OF NEW MACHINES

THE Air Ministry announces that the following Notice to Airmen (No. 5) has been issued :—

In order to assist the Aircraft Industry in the testing of new machines, it has been arranged by the Air Council that facilities shall be afforded for full official trials of machines, irrespective of the question of granting Certificates of Airworthiness.

It has been found unnecessary to subject Constructors to the delay and inconvenience which would be caused under Section 3, paragraph 8 of Pamphlet A.N.D. (1) (Directions issued under the Air Navigation Regulations) which lay down that, in order to obtain a certificate of airworthiness, type aircraft must be submitted to full official trials. Such trials are now limited to a test flight by a Government Pilot, usually at an aerodrome selected by the owner of the aircraft.

To meet cases, however, where constructors desire any official trials without references to the question of air worthiness, the Air Council have decided that such trials shall be undertaken under the conditions specified below :—

(*a*) That the tests are carried out at the place appointed by the Director of Research, and under the instructions and supervision of the O.C. Station, and by a pilot or pilots nominated by the O.C. Station, or by the Director of Research.

(*b*) That the Director of Research has satisfied himself that the machine is reasonably safe to fly before an official test pilot is required to carry out the test.

(*c*) That the machine is to be flown to the Station by the applicant's pilot and collected by the applicant immediately on receiving notice to do so from the Director of Research. In case the machine has to be dismantled for any purpose or collected or transported by rail, the dismantling, collection and transportation will be done by the applicant at his own risk and expense and without undue delay.

(*d*) That the machine shall be entirely at the risk of the applicant not only during test, but throughout the whole time it remains at any R.A.F. station, and also during transit to or from any such station, and that the applicant shall have no claim against any Government Department or any officer, N.C.O., or man of the R.A.F., for any damage however done to the machine.

(*e*) That a fee of £20 is paid by the applicant (cheques or draft made payable to "the Assistant Financial Secretary, Air Ministry" and crossed "Bank of England.") This fee will cover the use of such Government labour and accommodation for the storage of the machine as may be available, unless applicant fails to comply with the next condition (*f*); but all petrol, oil, spares and accessories must be provided by the applicant or paid for by him if provided from Government stocks, and no expense in connection with the tests will be borne by the public.

(*f*) If for any reason the Director of Research gives notice to the applicant to remove the machine, the removal must take place with all possible speed, and no claim for damages or expenses will lie against the Air Council or any other Government Department in respect thereof.

(*g*) That the Director of Research shall receive notification at least three clear days in advance of the date on which it is proposed to despatch the machine to the place appointed for the trials, and no machine shall be despatched until the concurrence of the Director of Research has been received.

(*h*) That the report of the trials is not to be published without the consent of the Director of Research.

◈ ◈

Progress of Demobilisation, R.A.F.

THE Air Ministry makes the following announcement :—

The total numbers of officers and men of the R.A.F. demobilised up to January 3 are as follows :—

Officers.	Cadets.	Other ranks.
26,087	21,258	227,229

The numbers demobilised during the week December 27 to January 3 are as follows :—

Officers.	Other ranks.
89	368

Owing to this rapid demobilisation many vacancies exist for skilled mechanics of various trades. Full particulars can be obtained, together with rates of pay from the Director of Recruiting, R.A.F., 4, Henrietta Street, London, W.C., or from any Air Force station.

Another Station Sign Post

IN addition to the railway stations previously marked with their names as sign-posts for aviators, the name Edenbridge has also been marked in large chalk letters on a plot of land adjacent to Edenbridge Station (S.E. and C. Railway).

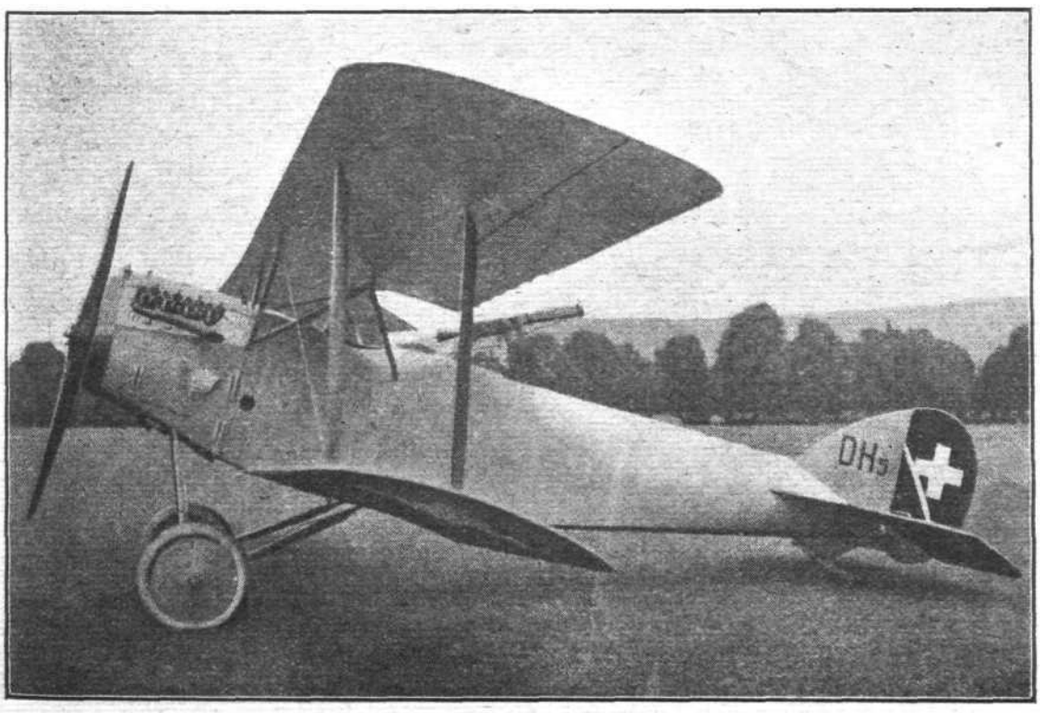
◈ ◈

Appointments for Ex-R.A.F. Officers

THE Ministry of Labour announces that the special section which for some time has been in existence at the headquarters of the Appointments Department of the Ministry of Labour to deal with matters relating to the Royal Air Force, has now been discontinued, and in future, officers and men serving in, or having served in, this Force, who have business with the Department, should apply to the appropriate district office, the address of which may be obtained from any post office.

Rigid Airship Construction

AT the next meeting of the Royal Aeronautical Society, to be held at the Royal Society of Arts on Wednesday, January 21, at 8 p.m., Mr. A. P. Cole, R.C.N.C., A.M.I.N.A., will read a paper on "The Principles of Rigid Airship Construction." The chair will be taken by Wing-Commander Cave-Brown-Cave, C.B.E., R.A.F.



The Swiss "D.H.5" (Haefeli) military biplane, which created two Swiss altitude records, one with and one without a passenger. In the former an altitude of 23,800 ft. was reached in one hour, and in the latter the altitude reached was 27,000 ft. The pilot in each case was Serg. Progin, and the passenger was Lieut. Haefeli, the designer of the machine. The machine has a span of 36 ft., and is fitted with a 200 h.p. eight-cylindered Winterthur (Swiss) engine.

From "Suisse Aérienne."

AIRCRAFT UNDERCARRIAGES

BY JOHN D. NORTH, F.R.AE.S., F.R.MET.SOC.

(*Continued from page 1599, Vol. XI.*)

Tyres

Construction.—Palmer cord aero tyres and rims are specially designed to withstand very severe lateral stresses.

The ordinary beaded edge tyre of the type used for cycles and motor cars has been found to give trouble when used for aeroplanes, because, when landing with a side wind blowing, the lateral stress set up in the tyre causes the "toe" of the tyre bead to lift, which allows the air tube to blow underneath and burst, or in some cases the tyre is pulled bodily off the rim.

For Palmer aero tyres a rim of special design is used, and the beads of the cover are so constructed that they lock in the rim and are thus capable of withstanding a very great lateral stress without either pulling out of the rim or "lifting" at the toe of the bead.

The rubber impregnated cord fabric is laid across the tyre connecting steel hooks in the bead. Alternative layers of cord and rubber form the tyre (see Fig. 8). The effect of this construction on the behaviour of the tyre under side load is shown in Fig. 9. The inflation pressure is important, an average of 50 lbs. per sq. in. being employed. Only a slight rise in pressure takes place under load.

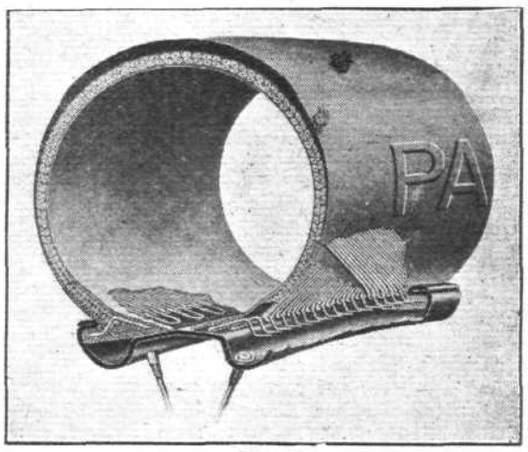


Fig. 8.

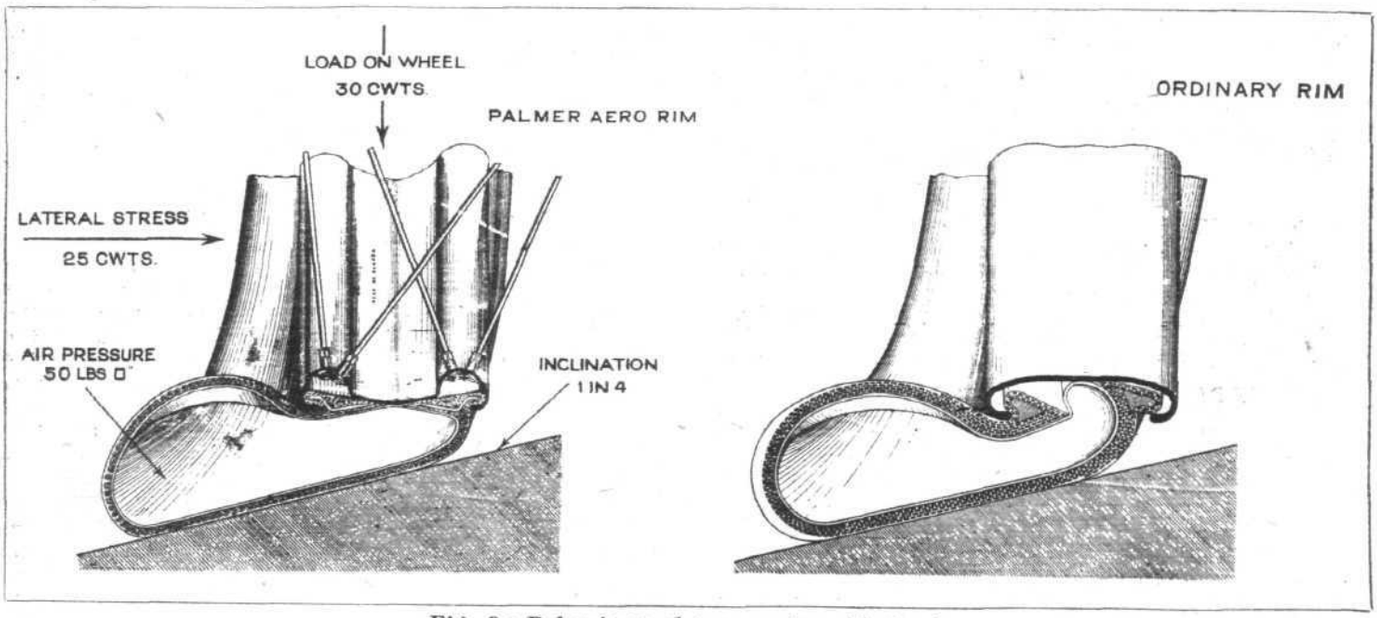


Fig. 9: Behaviour of tyre under side load

The machine for testing a wheel and tyre under combined direct and side loads is shown in Figs. 10 (a and b). The deformation of the tyre is here illustrated.

The following is a comparative list of the more usual sizes

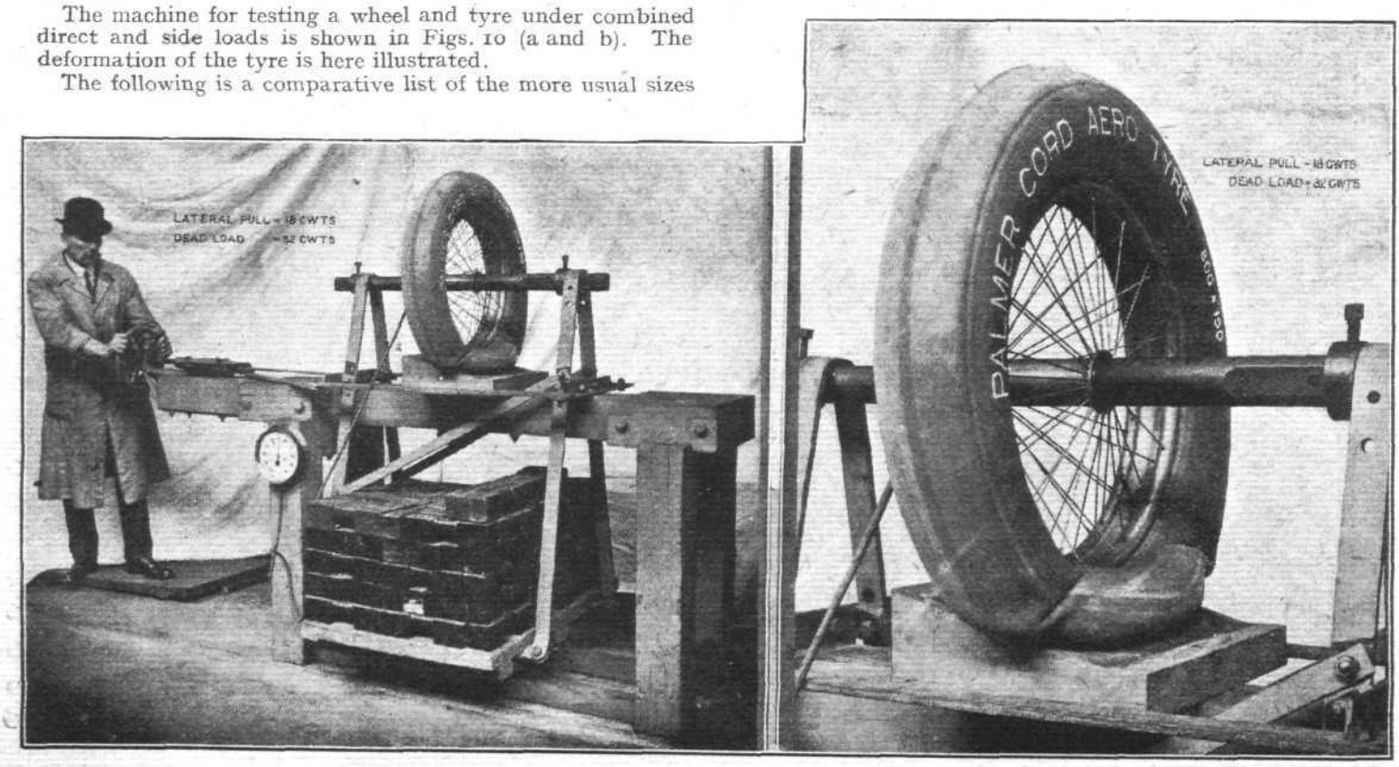


Fig. 10 (a and b): machine for testing a wheel and tyre under direct and side load

with their weights—complete with wheel and shield—and their safe load, carrying a factor of safety approximately 5 :—

Tyre.	Weight. lbs.	ozs.	Safe load. lbs.
600 × 75 mm. ..	12	3	1,000
700 × 75 mm. ..	14	14	1,100
700 × 100 mm. ..	21	6	1,600
750 × 125 mm. ..	23	8	1,800
800 × 150 mm. ..	28	2	2,200
900 × 200 mm. ..	55	0	4,000
1,100 × 220 mm. ..	81	0	5,000
1,250 × 250 mm. ..	114	0	6,000
1,500 × 300 mm. ..	145	0	8,000
1,750 × 300 mm. ..	194	0	9,000

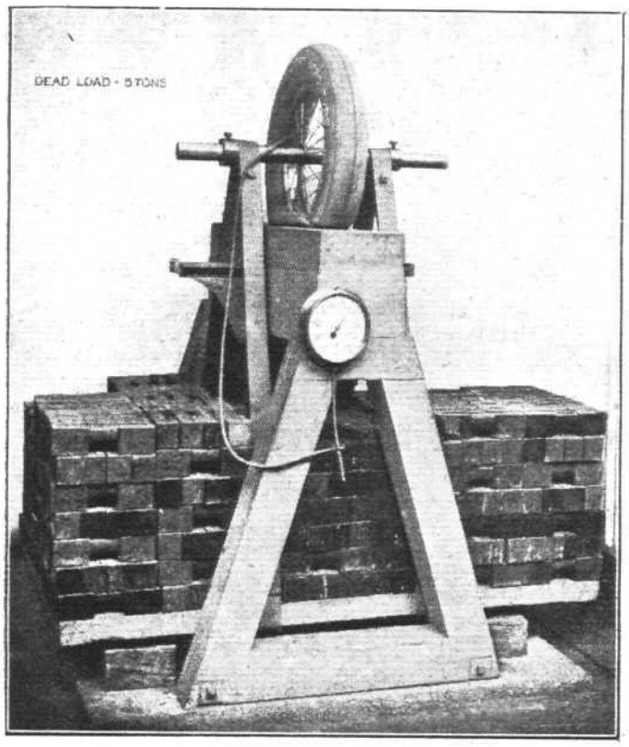


Fig. 12 : Wheels in testing-machine under 5 tons dead load

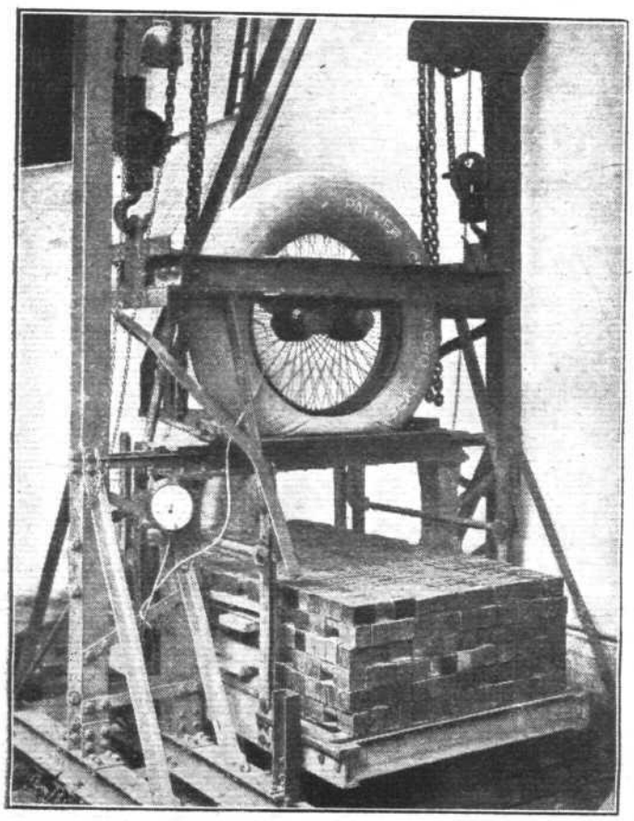


Fig. 13 : Wheel being tested for deflection

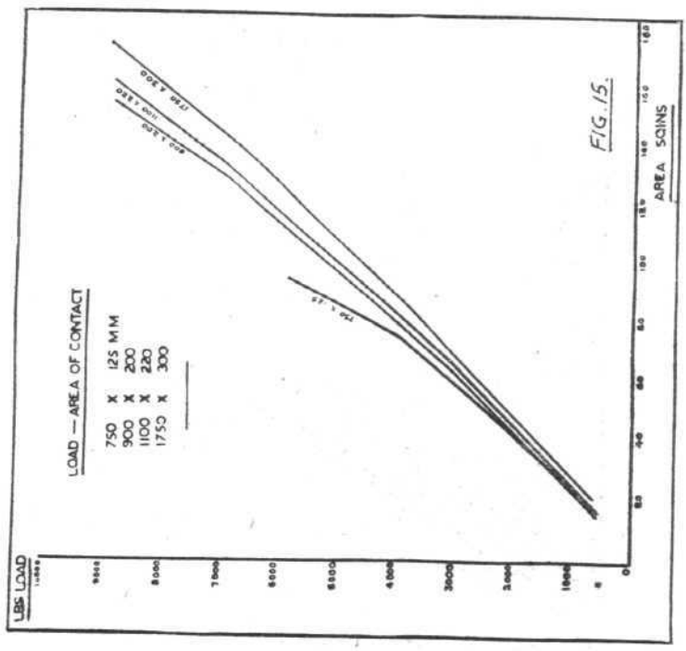
The loads given for all wheels up to and including 900 × 200 mm. are the results of actual testing. Beyond this size the loads are calculated.

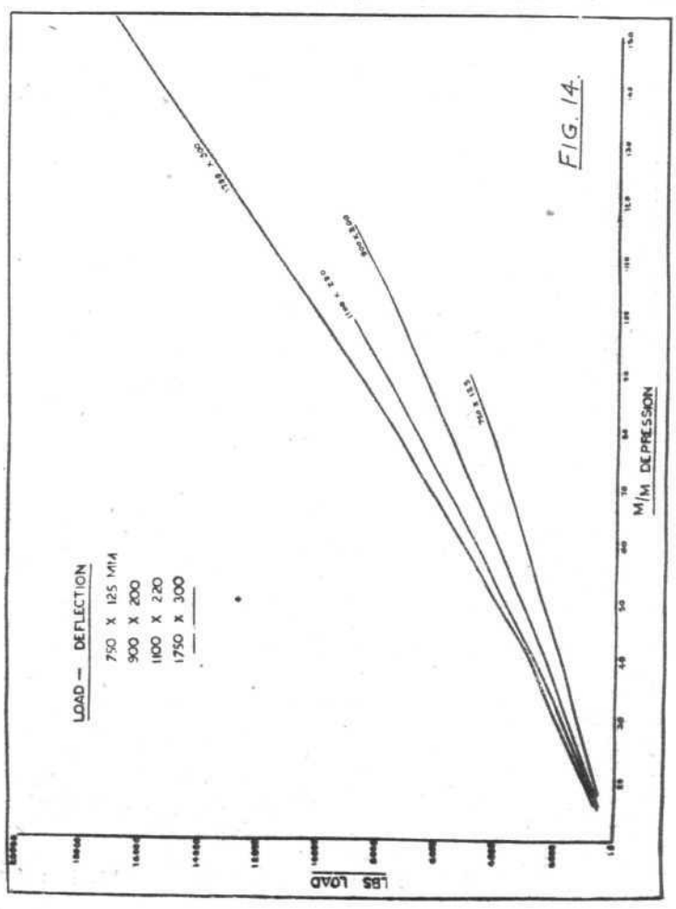
The permissible normal loads on wheels are often determined by ground conditions. The formula W = tread " × dia." × 12 is generally employed to check for bearing pressure. In the event of abnormally soft ground special square treads are used.

The wheels are tested in a special machine, and the deflections due to given loads are noted (Figs. 12 and 13). In Fig. 5, giving deflection against load for a 1,100 × 220 mm. wheel, was also given the deflection of the wheel ; this is obviously so small that it can be safely neglected, and has been omitted in the other cases (Fig. 14).

On unloading the load deflection curve falls below that obtained on loading ; the area between the curves is a measure of the work dissipated. This, in the case of "static" loading, is of the order of 8 per cent. of the total work.

Fig. 15 gives the area of contact for the same four wheels under varying load.





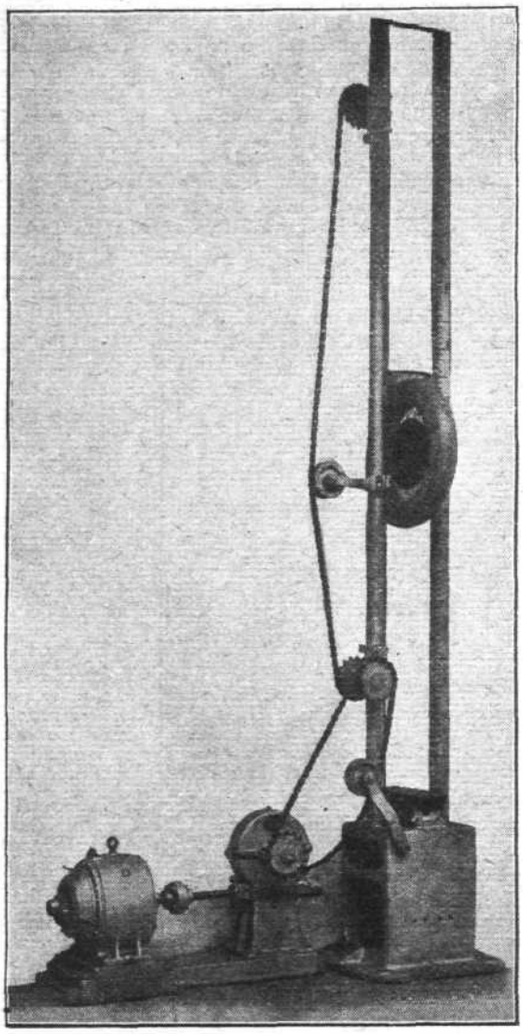


Fig. 16: Bouncing wheel testing machine

In all these cases the load has been applied and taken off gradually, but when it is applied suddenly—and in actual practice on aeroplanes this is always so—there may be, and investigation has shown there is, considerable difference.

The Palmer Tyre Co. have kindly carried out, at my request, a number of tests on a 750 × 125 mm. wheel, both with gradual and sudden loading.

For the sudden loading the wheel was weighted till the total weight was 150·5 lbs., and placed in the bouncing wheel testing machine (Fig. 16). From a known height the weighted wheel is dropped and the area of contact is obtained by means of a trace on an absorbent pad (Fig. 17). The height to which the wheel bounces is noted. The depression of the tyre is obtained from a knowledge of the area of contact (Fig. 18).

If h, h' and k feet are respectively the dropped height, the rebound height and the depression, then the energy stored in the tyre when most depressed is given by

$$150 \cdot 5\ (h + k) \text{ foot pounds}$$

and the energy on the rebound

$$150 \cdot 5\ (h' + k) \text{ foot pounds}$$

The hysteresis is $150 \cdot 5\ (h - h')$ foot pounds,

which expressed as a percentage of the original energy is

$$\frac{h - h'}{h + k} \times 100 \text{ per cent.}$$

(Fig. 19).

The results obtained are tabulated below :—

h ft.	k ft.	Energy taken up. ft. lbs.	Energy given up on rebound. ft. lbs.	Energy dissipated. ft. lbs.	Energy dissipated. per cent.
1	0·15	172·5	133·3	39·2	22·7
2	0·20	330·9	264·2	66·7	20·1
3	0·24	487·5	396·7	90·8	18·6
4	0·28	643·3	526·7	116·6	18·1
5	0·31	800·0	656·7	143·3	17·9
6	0·34	954·2	768·3	185·9	19·5

A similar wheel was next subjected to "static" loading, and the same depressions of the tyres obtained. The results are tabulated below :—

k ft.	Load. lbs.	Energy taken up. ft. lbs.	Energy given up. ft. lbs.	Energy dissipated. ft. lbs.	Energy dissipated. per cent.
0·15	2,110	125	—	—	—
0·20	3,100	250	230·8	19·2	7·7
0·24	3,790	385	355·8	29·2	7·6
0·28	4,500	550	507·5	42·5	7·7
0·31	5,250	724·2	669·2	55·0	7·6
0·34	5,800	904·2	830·8	73·4	8·1

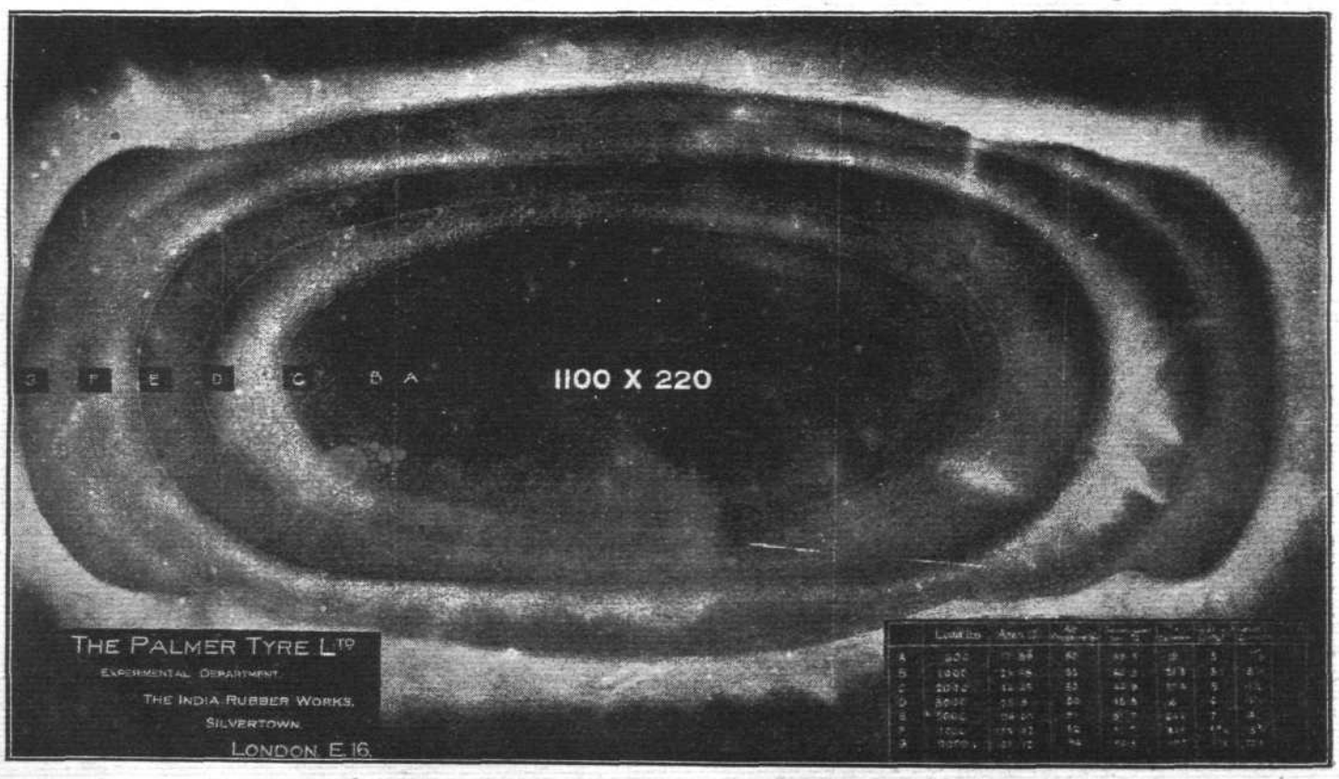


Fig. 17: Area of contact

The most interesting points in a comparison of the two series of tests are, firstly, that in the "dynamic" tests for a given tyre depression more energy is absorbed than in the "static" case, and secondly, a higher percentage of the energy is dissipated (Fig. 20).

The former of these results agrees in principle with results given in C.I.M. 744 and also quantitively for the smaller depressions. On a number of wheels of varying size and varying internal pressures the load required to depress the tyre completely, and hence the energy taken up by the tyre, was determined. To obtain the same depression by dropping a heavy weight on the tyre another set of figures for the energy was obtained. Comparing the two, it was found that with sufficient accuracy the energy absorbed in the "static" test was 70 per cent. of that in the "dynamic." In the figures given above (Palmer tests) this rises from 72 per cent. for the one-foot drop to 95 per cent. for the six-foot drop.

Before leaving the tyre question it is interesting to note the extreme range covered by the Palmer aero wheels and tyres. This is well illustrated in Fig. 21.

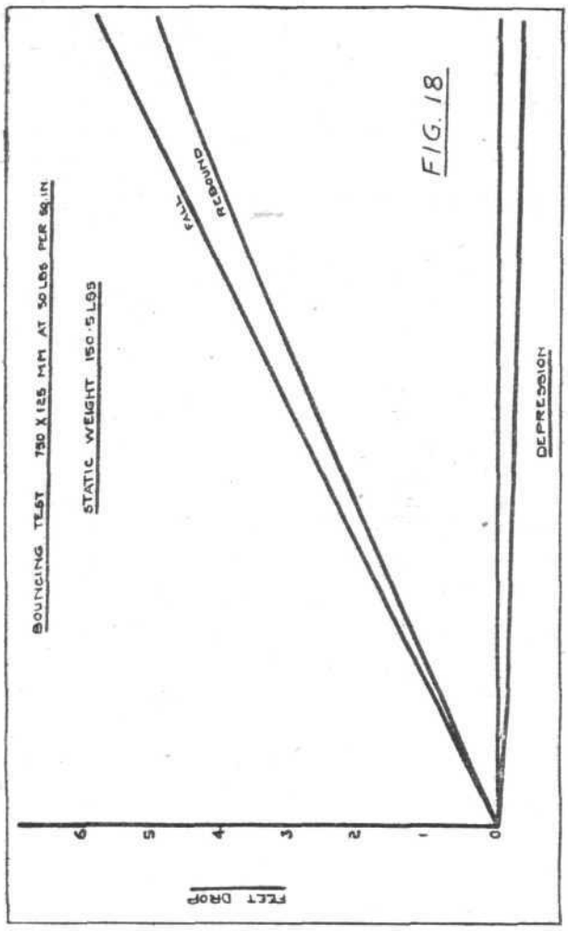


FIG. 18

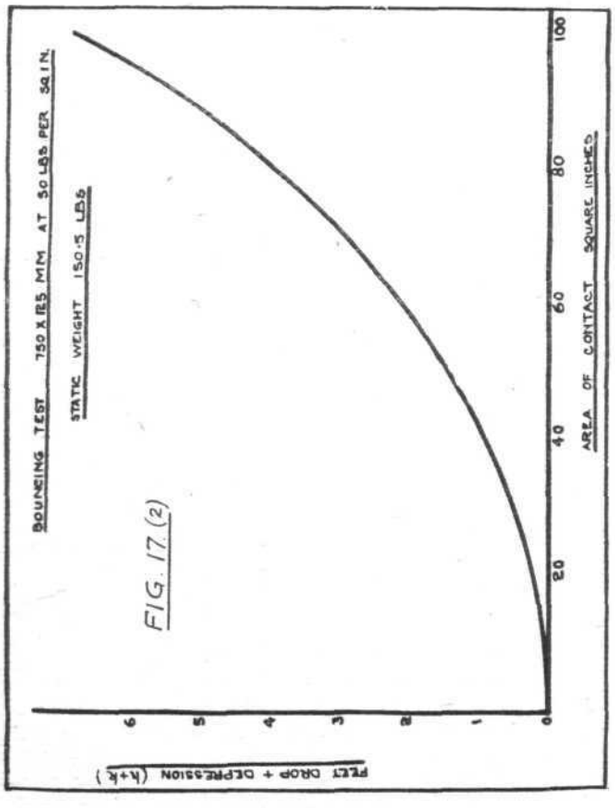


FIG. 17 (2)

Axle

The axle on which the wheels are mounted is itself capable of absorbing a certain amount of shock, but even in extreme cases this does not exceed 8 per cent. of the total kinetic energy of the machine, and has been neglected in most of the work that follows.

A general uniformity of axle design has now been arrived at. The Air Board specification usually demanded for axles is either T.2 or T.14. T.2 is a nickel-chrome steel having an ultimate tensile strength of not less than 85 tons per sq. in. T. 14 is a tempered carbon steel, the U.T.S. being rather lower than for T.2.

Since axles are not called upon to sustain bending moments of the same magnitude in all planes, it is not certain that the circular steel tube represents the last word in axle design, particularly in very large machines. Some developments in beams manufactured from steel strip may perhaps be applied to axles, but the subject is too wide and too controversial to be considered here.

Wheels, Tyres and Springs

The undercarriage in which the shock absorbing is confined to the tyres is a comparative rarity, and the axle is commonly sprung, usually with rubber, to the remainder of the structure. Steel springs can easily be shown to be heavier than rubber, and as the principles governing the design of steel springs are common engineering knowledge they need not be discussed.

A comparison made between a German-made steel spring and British-made rubber showed that the latter had the advantage in both weight and shock-absorbing capacity. (See C.I.M. 743.)

As a matter of almost universal practice, the rubber shock-absorber consists of a number of strands of rubber held in an initial state of strain and protected by flexible linen braid. This braid has an important influence on the load extension diagrams.

Of the two forms of rubber shock-absorbers there seems little doubt that the better is that of a number of rings.

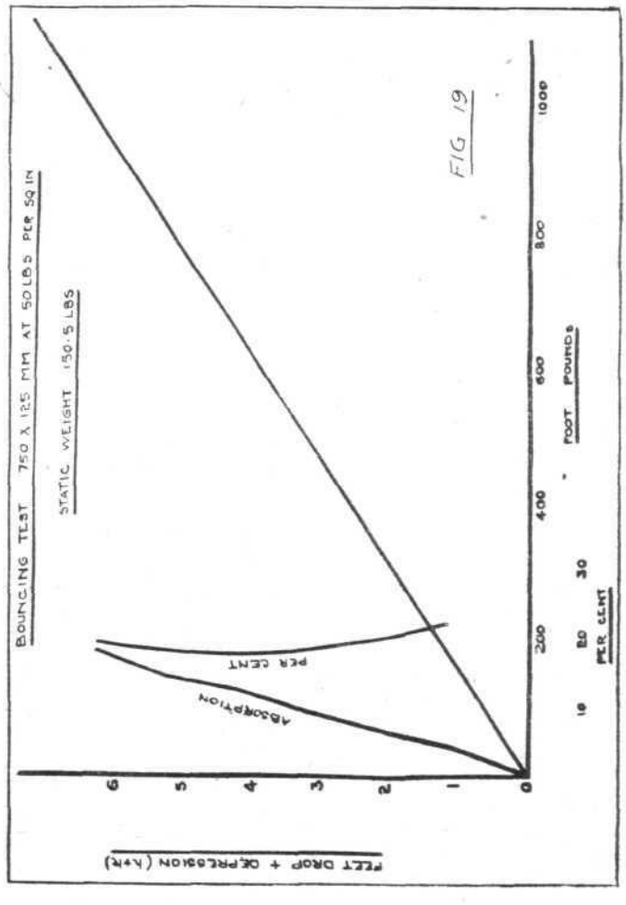


FIG. 19

In the first place, tests show that the shock-absorber in the form of a ring is more reliable than in the length since all the materials are under better control during manufacture. The tensile strength of a 20-yard coil generally varies considerably at different positions of its length, and no precautions taken in manufacture will materially reduce this variation, whereas 20 rings each of a yard mean circumference, made

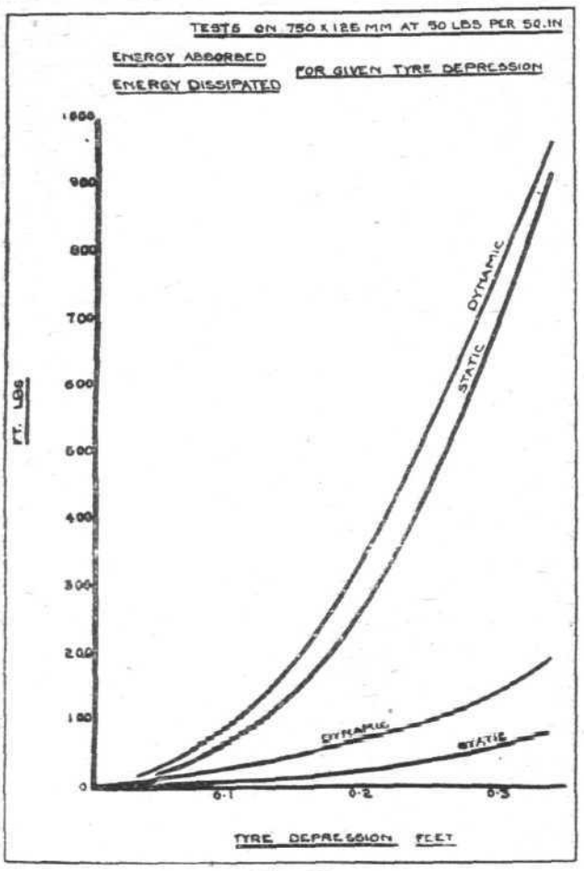


Fig. 20.

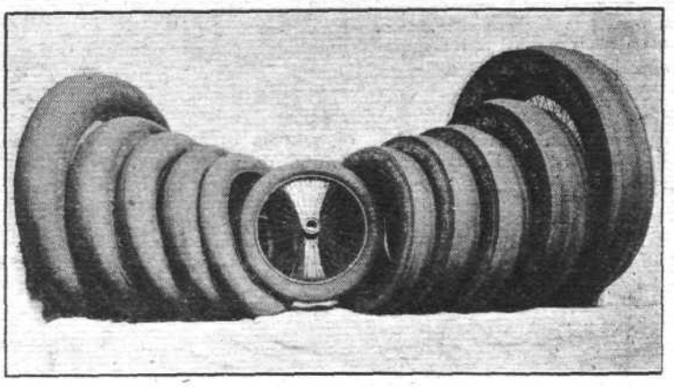


Fig. 21 (1): Range of size of Palmer tyres

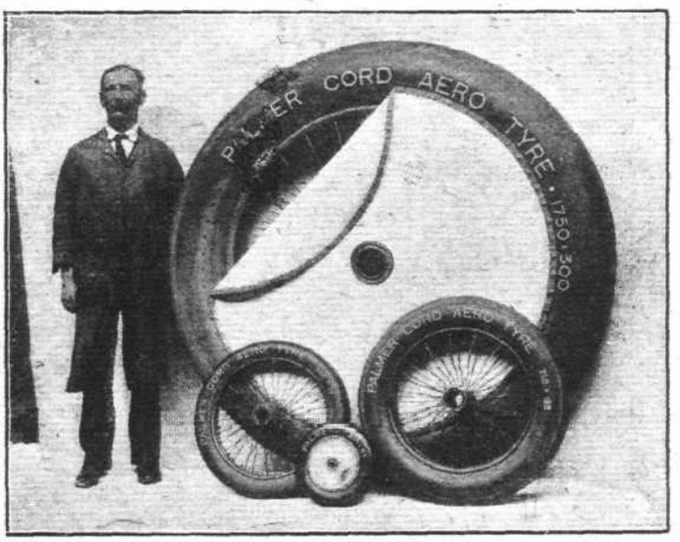


Fig. 21 (2)

under the same conditions, will give far more uniform results.

Secondly, it is very improbable that the initial tension on a straight cord, wrapped round by hand power, will be the same in each lap. In the case of a number of rings a uniform initial tension is fairly readily and accurately obtained.

(To be continued.)

The Rome-Tokyo Flight

IT appears that there will be two poets taking part in D'Annunzio's Rome to Tokyo expedition, as the Japanese writer, Scizoy, will be one of the passengers. The machines include two 900 h.p. Caproni triplanes, a 450 h.p. Caproni biplane, and probably five Sva machines. The start is fixed to take place from the Baracca ground, near Rome, on Monday, and the first stages will be Salonica, Smyrna, Adalia, Aleppo and Baghdad.

The small Caproni, which will act as a pioneer, left Rome on January 8, with Lieuts. Scavini and Banalumi on board, and has reported at Avlona and Salonica.

American Airship Services

ADMIRAL PEARY, discoverer of the North Pole, has agreed to become president of the Aero-cruiser Co. of America, which plans to establish services of dirigibles between Europe, America, and North and South America, says the *Times* correspondent in New York.

"The company has adopted designs for a standard type of dirigible, the first of which will be completed in the next 12 months. It will differ radically from the Zeppelins or any British airships. The envelope will be saddle-shaped the two sides coming partly down over the cabins."

The Treaty and German Aviation

Now that the Peace Treaty has been signed the Air Commission of Control which will see that Germany complies with the air clauses in the Treaty, is getting actively to work. According to *The Times* the Air Commission of Control has ordered in Berlin:—(1) For the housing of the officers of the Commission, a hotel of 200 rooms; (2) For offices, a further 100 rooms. (3) Quarters for 450 persons. (4) Garages for 60 motor cars.

The air clauses demand the demobilisation of air *personnel* within two months, the immediate surrender of air material, and the prohibition of all manufacture of aircraft for six months.

German Commercial Flying

"IT is reported that German aviation is to be resumed to-day, after several weeks' interruption due to fuel shortage," writes *The Times* correspondent in Berlin on January 7. "Passenger services are being established throughout the country.

"The future of aviation, and especially the question of nationalisation, is receiving much attention in some organs of the German Press. The *Post's* correspondent urges that it is not a matter for towns, but for the Empire, otherwise he sees danger of Germany's being flown over by Entente airmen at Germany's expense, as indicated in the case of the Hattersheim aviation ground, near Frankfurt-on-the-Main, which has cost 10 million marks, and has been built at Germany's expense.

"The General Air Service Co. writes that the development of Germany's air service is completely dependent upon its being linked with the International Service, since it is in the nature of this service that it can only acquire importance if applied to long distances and especially sea routes."

FLIGHT

Correspondence

[The Editor does not hold himself responsible for opinions expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for insertion in these columns.]

COL. HOLT ON PARACHUTES AND THE AIR MINISTRY

[1988] I have read with interest Lieut.-Col. H. S. Holt's letter, published in your issue of January 1, on "Life Parachutes and the Air Ministry," in which he appears to have unnecessarily made himself very unhappy on the subject of the "positive" opening action of parachutes mainly, as it would appear, from a misconception of the proper use of the term and of the extent to which "positive opening" is applicable to various kinds and types of parachutes. All who have acquired a scientific and practical working knowledge of the behaviour of man-dropping parachutes, cannot fail to acknowledge that the two vital features making for safety in every contingency for parachutes of every type and use, are "positive opening" and the prevention of entanglement of the rigging. There is still so much to be done in the co-ordination of the design of aeroplanes and of effective life-saving equipment, that all who have this subject at heart will welcome the interest which Col. Holt or any other intelligent person may take in the matter; but if Col. Holt is running a tilt against the Parachute Section of the Air Ministry, because they have so far favoured parachutes combining the principles of "positive opening" and "non-entangleability" of rigging, he is not doing useful work, but demonstrating to all and sundry that he has something yet to learn of the science of the parachute. Col. Holt's definition of "the essential difference between the two types" of opening is fogged by the fact that he confuses *methods of opening* with *kinds* and *purposes* of parachutes. The fact is that any kind of parachute used for any purpose whatsoever can be so constructed as to have "positive" or "non-positive" opening.

Now what is "positive" opening? As the inventor and patentee of the first parachute with "positive" opening, and of a dozen other distinct types of "positive" opening, each of which is specially adapted for some different application, may I be permitted to offer a generic definition of "positive opening" as "any mechanical means by which, at the moment of its fall, the exterior air is positively introduced without possibility of obstruction into the interior of the nested parachute body, in such considerable quantity that, immediately subjected to compression, it expands the parachute body by an elastic and reliable internal force which cannot fail to act." This definition covers all the various "positive openings" for which I have been responsible. In the nine years I have been at work on "safety parachutes" I have already patented all the really simple and, therefore, safest methods of "positive" openings, and other inventors, seized by the value of "positive" opening, are compelled, in the endeavour to avoid my patents, to contrive mechanism so complex, that the risk of failure through this complexity is as great as with a "non-positive" opening. This, by the way.

Col. Holt speaks of a "good form of non-positive" parachute. There is and can be *no* good form of "non-positive" parachute, for the simple reason that the apex aperture of the silk body acts as a most efficient air ejector in creating a partial vacuum within the body, and if there is no mechanical means for widely opening the mouth of the body, there always remains an appreciable risk of the vacuum sucking the whole body together for its entire length. If the gussets at the mouth should happen to overlap, the parachute never opens, and the aviator must fall to certain death. The *risk* of such an eventuality is *always* present in the use of a "non-positive" opening parachute; there is *always* a struggle between the vacuum within the top of the body and the external air trying to make entrance between the fluttering gussetts at the mouth. If they completely overlap and the increasing resistance of air against the mouth holds the gusset together, then goodbye. The very great variation in the length of the drops of "non-positive" parachutes before they open, is now well understood by practical parachutists to be due to this cause, and they are now wide awake to what it means in respect of increased personal risk. On the other hand, with the same load and in the same conditions the "positive opening" parachute opens with precisely the same depth of fall every time in the most machine-like way. There is no case known of a "positive opening" parachute failing to open exactly as it was designed to do. It is not only the flying men who now understand the advantages of "positive opening"; but the insurance companies also, and they will have a very considerable say in the specifying of what kind of life-saving equipment shall be employed for civil aviation, in which they are called upon to take risks. Would Col. Holt think it right that the Parachute Section of the Air Ministry, which thoroughly understands the distinction between the two methods of opening—one infallible and the other fallible—should adopt the one which must destroy the confidence of those who would have to use it?

The "positive" opening parachute, although its expansion is gradual, and without the explosive openings which have sometimes burst "non-positive" parachutes, opens quicker and carries its man at the safe landing speed in the shortest possible time. The quicker the "dropping type" of parachute opens, the lower the height from which a man can be brought safely to earth. I am not in favour of "delayed action" parachutes for use with aeroplanes, of which there are advocates, for the great bulk of aeroplane accidents occur at low altitudes when every second is of vital importance, and, in the case of an aeroplane out of control, the pilot will struggle with it to the very last moment before "abandoning ship."

Let me now revert to Col. Holt's mix-up of "openings" and "kinds" of parachutes, in order to try and clear the situation a little. The two main distinctive classes of parachutes are "soaring parachutes" and "dropping parachutes," the one thrown up *above* the *fuselage*, and the other dropped from *below* the *fuselage*. The "soaring" class may be sub-divided into "inflation," "ballistic," and "drag" types, all of which, as I have designed them, have "positive" openings. The "dropping" class contains a very large variety of parachutes, characterised mainly by the positions in which they are to be carried on an aeroplane, the special design of their containers and other features intended to adapt them more closely to their intended use. These include "either-side-drop parachutes" carried within the fairing behind the pilot's seat in which the container is dropped on either side of the *fuselage*; "*aileron* parachutes" carried within the wings; "streamlined container parachutes" in which the parachute is carried within a torpedo-shaped case, and, if fixed above the *fuselage*, it can make an either-side drop, or if carried below or at the side of the *fuselage*, an either-side drop can be made by special apparatus which has been designed for the purpose. There are also parachutes specially designed to be carried within the *fuselage*, or within a streamlined casing below the *fuselage*: at the rear of the axle and in other situations. Lastly, there are "quick-disconnection parachutes," in which the nested body instantly ceases contact with the aeroplane and subsequently expands; "knapsack parachutes, carried by the aviator on his back; "stomacher parachutes," carried by the aviator in front, both of which open and expand in his fall. Other parachutes, some more suitable for airships and observation balloons, are "basket parachutes," "two-and-three-speed parachutes," "variable speed," "dirigible" and "delayed action" parachutes. To every one of these types "positive opening" and "non-entangleable rigging" can and should be applied.

If Col. Holt will take the trouble to get from the Patent Office the complete series of my parachute specifications, he will find that "positive opening" has been so applied.

Col. Holt occupies a full column of your journal in an elaborate argument intended to show that in a steep spinning nose-dive a parachutist will drop at the same speed as the machine, and will not be able to exercise sufficient "pull" on his parachute, if the container is attached to the aeroplane, to release it from its container, and that the only solution is a "non-positive" opening parachute, really meaning thereby a *carried* parachute. I agree that in certain applica-

tions a carried parachute is of great value, and have included types in my patents, all with "positive" opening. With the "dropping" class of parachutes I also agree that the steep nose-dive finds it in its most ineffective operative situation on account of the pull of gravity on the man being so nearly in line with the path of the machine, but fortunately the air resistance to the body of a man—which is not streamlined—is relatively greater than that to an aeroplane—which is streamlined—so that the man will certainly not fall as fast as the machine, although his momentum, being that of the machine at the time of his jump, will at first carry him in a path and at a speed almost identical with that of the machine. But carried parachutes, by reason of their bulk and weight, are a nuisance; stowed parachutes attached to or housed within the *fuselage* are convenient; and as to which should be approved in a difficult case is just one of those responsible decisions that must rightly be made by the only competent authority—the technical advisers of the Air Ministry. But the case is not at all as hopeless for the stowed parachute as Col. Holt assumes, for with the assistance of a small "resistance parachute" carried on the person of the parachutist, particulars of which will be found in one of my specifications, the falling speed of the parachutist in a steep nose-dive will be so instantly checked that the requisite "pull" will come on the main parachute and will at once release it, when its "positive" action will cause it speedily to open without shock or risk of bursting. At such a high dropping speed a "non-positive" parachute, when it opened suddenly, would probably burst.

Nevertheless, for the steep spinning nose-dive no parachute can ever hope to equal the "soaring" type, the action of which in such a contingency is at its *maximum* of effectiveness, while that of the "dropping" type is at its *minimum*. The "soaring" type has this further great advantage over any form of the "dropping" type, that while the latter requires an elevation of at least 200 ft. to bring a man down safely without hurt, the former is effective, if the machine has sufficient speed, at any height from ground-level upwards. The parachutist has not to get out of his machine. He moves a lever; his seat becomes an inclined plane; and the parachute, with springiness in its pull, gently lifts him out of it. It will act equally well whether the machine is flying sideways or upside down.

Now that the designs of aeroplanes for civil aviation are in a state of flux, it is sincerely to be hoped that the Parachute Section of the Air Ministry will pay closer attention to the development of life-saving equipment in all of its possible forms. *Now*, while business is slack, is the time to carry out research work of this character. During the War nothing was permitted to interfere with the mass production of machines. Mass production in a hurry may be wanted again, so why not get the life-saving problem solved while there is time? It is understood that the Air Ministry on its military and civil sides are desirous of getting ahead with life-saving equipment of all kinds; but the Treasury, which indignantly denied at the time of poor Peter Legh's death that they were withholding funds for parachutes, are certainly doing so now. Since then many more useful lives—some of the best—have "crossed over" for want of aerial life-saving appliances made normal for instant use. The coroner has only to certify that they weren't murdered; he is not concerned to enquire how such a fatality could have been prevented, or how in a similar accident the next man can be saved. There is a handsome funeral, with pictures and references in the Press to the great services of the deceased, but no one else seems to care. The politician doesn't care—the crash has nothing to do with votes—for there is nothing to be gained and there is no money in it for anybody. So nothing is done. It is only the mother and the girl who really care and grieve.

And there are so many more crashes to come, each one of which will strike a blow at civil aviation. Why won't the Treasury let the Air Ministry get to work and put an end to them? The public won't come in until this is done, and until we are in possession of an adequate fleet of civil aeroplanes, supported alike by the public and by every Government Department, this country will never be safe from sudden attack in the air. Anyhow I am keeping my old tin hat.

E. R. CALTHROP, M.Inst.C.E., M.I.Mech.E.

Eldon Street House, E.C. 2. January 5, 1920.

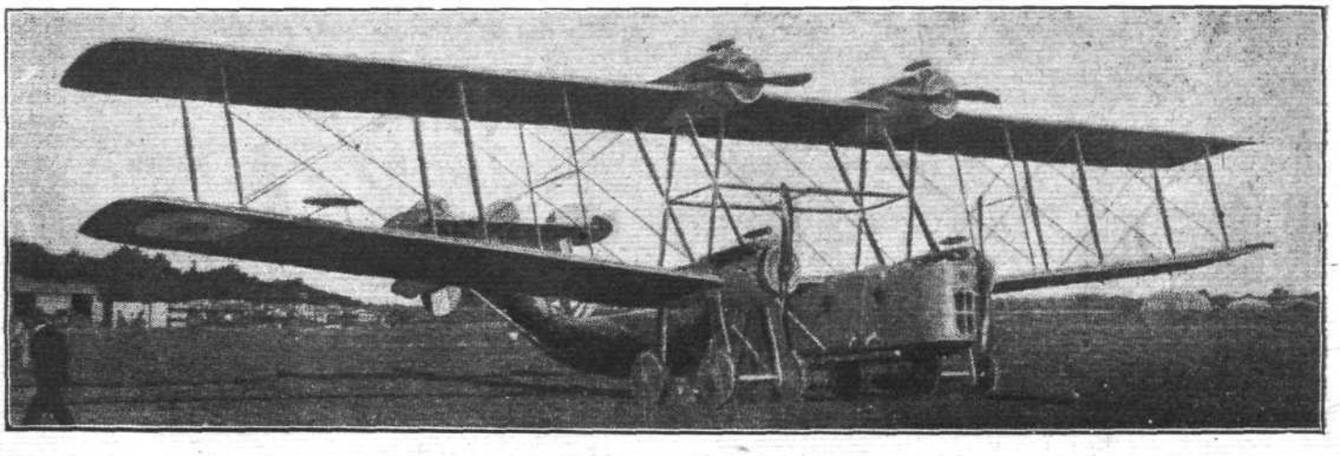
AN AIR LEAGUE.

[1989] The suggestion made in the Editorial Comment of your issue of January 8, as to the formation of an Air League, is one which must commend itself to those who have at least not only the welfare of aviation, but of the country and Empire generally. Never was there a time when it so behoved us to see that our armament was in fit condition to meet any possible contingencies. Fifteen months have elapsed since the Armistice, and the League of Nations remains a paper "point"; the smaller nations rattle their undried swords; and, throughout the world, the enemies of law and order begin to make head, biding their chance. It is for us to see that the chance is never afforded them.

The work of the Navy League has been so admirable that it is not from motives of mere imitation that I would suggest that an Air League be built up along somewhat similar lines. The interests of aviation in the past have been left too largely to the care of bodies whose Olympian remoteness and "superiority" have made them inaccessible to the general public. From these bodies as pioneers, and from the "men of mark" in military and civil aviation, we might look for the president and council of the proposed league; but it is upon the rank and file that the success of the organisation must depend. Membership should be thrown open to all who are willing to pledge themselves to further by every means in their power our supremacy in matters aerial. Branches, even though but two or three just men be gathered together in one place, should be formed, not only in the towns, but in the villages and hamlets as well; and no corner of Britain should be left untouched.

No organisation could start with greater advantages in the way of attractiveness of propaganda. Lectures could be arranged, for which sets of limelight views could be loaned by the central body; and from time to time, as necessity arose, larger demonstrations should be held in the most convenient centres. Members of Parliament who talk largely enough of our Army and Navy, would be made to realise that we have also an Air Force, which, at the moment, they appear to have forgotten; would be reminded that in the world of commerce and the work of Reconstruction, civil aviation would play no small part, were it but allowed to do so; and Governments which might attempt to emasculate our most effective striking arm would be compelled to yield, if not to the common sense, then at all events to the common demand of those who set them in authority.

January 10, 1920. R. A. S.



The experimental Blériot four-engined biplane—the forerunner of the large 'bus illustrated in "Flight" some little time back. It badly crashed on its trial flight owing to the tail bracing being insufficiently strong. The engines are 300 h.p. Hispano-Suizas

AIRISMS FROM THE FOUR WINDS

WHO will be the first to fly the Cairo-Cape air-route?

\- - -

IF Lord Fisher proves as right—and we believe he will—in aeronautical forecast as he did in regard to our Navy, the recording of his series of appeals on behalf of a paramount air fleet should, one of these days, prove of considerable historical interest. So here is a further contribution from the tough old Admiral to his already long list. And Sir William Watson has taken a hand in backing up that "Aviation spells Salvation." Lord Fisher writes:—

"Justly described as the most distinguished of living poets, he writes me that Thor's Hammer is urgently required to beat into the British mind that Aviation spells Salvation. Even Macaulay's Schoolboy knows that it's not war aviation that's at stake! Civil aircraft are capable of the war job. They are depicted leaving their peaceful avocations (I take this from a war picture) and arriving in their thousands of thousands (darkening the heavens in their flight), and without a declaration of war appearing unexpectedly over London and pouring down cascades of lethal gas (the humane describer adds there is a good deal to be said for a gas which kills without torturing).

"Terror is no argument, least of all in our nation. When our blood is up we are equal to any fate. Nevertheless, the Germans are going ahead of us in aviation-structure and aviation-engines. Intellect, imagination, push, money—all are pleading—yet the Air Service, under a Sub-Secretary, is relegated to the War Office—bad enough if it had been relegated to the Admiralty, for, after all, that good Admiral was right (all Admirals ain't good) who told Mr. Pitt that the business of the Admiralty was to prevent oversea invasion, and that it wasn't a military business. We must appeal unto Cæsar (Cæsar has had a good look in at the Spen Valley). Over four hundred millions sterling for probably more conscription if we are going to take on Russia, and a hundred and fifty millions for the Admiralty to buy 'bows and arrows.' when a fraction of all this wanton waste spent in aviation would keep us in the forefront of the world, both in commerce and in war. All this is what no fellow can understand! Cæsar shortly will Sack the Lot!"

THEN follows the inevitable P.S.:—

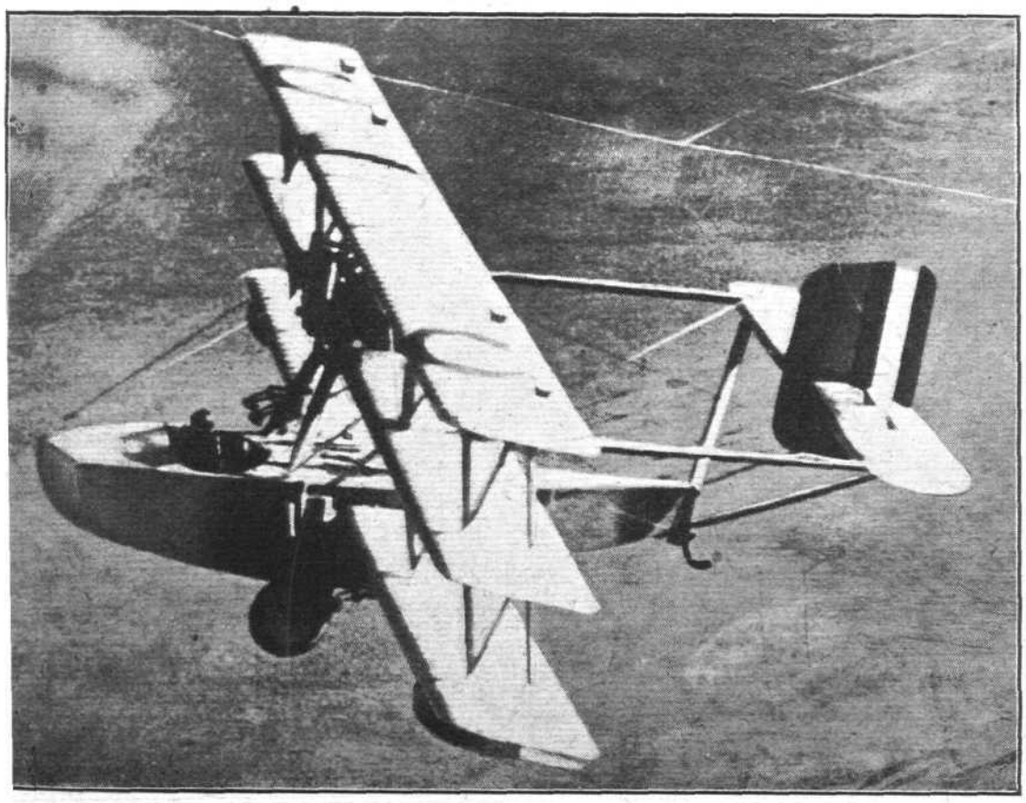
"I've quoted," continues Lord Fisher, "from a lecture on the next war. Every fool knows that every war begins where the last war left off. Every airman knows that when the last war left off such a bombing had been arranged for Berlin (and was kept from starting) that would have made that city dust and ashes. Some people say the German nation at large still believes it wasn't beaten. There is a good deal to be said for this atmosphere that pervades Germany. Yet one does admire Foch, even if he saved but one widow. It is computed that by agreeing to the Armistice when he did, Foch saved two hundred thousand Allied casualties alone. The Germans would have been mown down (or bombed) in masses."

\- - -

THE premises of the Royal Aero Club narrowly escaped destruction last week. There was an outbreak of fire which was discovered at 5 a.m. on the morning of Thursday by a member staying at the Club, and the speedy arrival of the Fire Brigade saved the situation. Some damage was done to the main staircase just above the first floor, with the result that traffic between the reading-room and the dining-rooms on the second floor was difficult for a day or two. The ascent had to be made by means of jumping over sundry boxes and across the space formerly occupied by three stairs, but there were no casualties recorded. If the whole staircase had gone the position would have been very awkward, if not dangerous.

\- - -

BY the way, the Club premises are receiving fresh decorations almost weekly. Numerous interesting old photos. and engravings relating to aeronautics have been hung on the walls, and now a fine collection of heads of big game has been displayed. We understand this is the result of a hunting expedition in Rhodesia and East Africa by one of the Club members. But who was the irreverent member who said the Club was beginning to look like the Cattle Show?



The Sperry Triplane, combined flying boat and land machine.

THE paragraph inserted in our last issue regarding the report of a gift of 100 machines to Canada brings us a few words from a correspondent, who confirms and elaborates this statement. He says that the Government have, in fact, presented to Canada over 100 aeroplanes and seaplanes of various types, together with six months' supplies and spares of all kinds. These have been collected and packed at an aerodrome on the South Coast and will be on the way to Canada very shortly, if indeed they have not already started. Similar gifts have been made to our other Overseas Dominions, and the scheme seems a most practical way of disposing of the enormous accumulation of War material left on our hands since the Armistice. It gives the Colonies a splendid start in training the Air Services which each will require, and will doubtless be greatly appreciated.

\- - -

WAR damage claims to Thanet towns against Germany amount to the nice little sum of £435,646, and a good deal of this is directly allied to aircraft damage. Margate, Ramsgate and Broadstairs apportion their losses respectively as £275,646; £100,000 and £60,000. It is to be hoped they may get it.

\- - -

IN the mishap, during the recent gale which swept the country, to the Handley Page machine at Werrington, Peterborough, which broke away from its moorings and got across the Great Northern rails, it was not the Coo this time, but a case of "bad for the 'plane." The men in charge of the giant, snugly inside the cabin, must have had a rude awakening.

\- - -

THAT moon-reaching rocket of Professor Goddards, which is taking such a rise—probably by way of practice—out of the general Press this week, is indeed a bit of a flyer, which it is to be hoped may make good. It only shows what inspiration such enterprises as flying the Atlantic and the Australian flights engender. Backed as it is by the Smithsonian Institution, one must e'en treat this bold claim with seemly respect. Therefore, get ready your apparatus, ye astronomers, amateur and professional, so that that "sufficient quantity of brilliant flashpowder" (to be carried in the flying rocket) "to the surface of the moon to make its ignition on impact visible through a powerful telescope," may not be wasted, as this, it appears, "would be the only way of proving that the rocket had left the region of the earth's attraction, as once it had escaped that attraction it would never come back."

\- - -

A CORRESPONDENT of Quex's in the *Evening News* is a little doubtful of the date of the flight of Sydney Pickles, with his mother as passenger, from France to Folkestone Harbour. It was on July 21st, 1913, and quite an interesting account of the journey appeared at the time in FLIGHT, of August 2nd, from the pen of Mrs. Pickles. Bringing over Caudrons by that method was quite a "stunt" of Sydney Pickles in those days, and on his first journey across in June of the same year, he had quite an experience Margate way. Details of this little episode of the sea were duly recorded in FLIGHT of July 5th, 1913, a unique story appearing in that case from the passenger who was "pressed" into Pickles' service as ballast just ten minutes before the start from the Caudron works. Funny things happened in those days. Yet, mark you, that was only in 1913!

\- - -

CAPTAIN ROSS SMITH, the hero of the Australian flight, has given particulars of a discussion which he had, in relation to the Cairo-Karachi aerial post-service, with the Indian Postmaster-General, who is keen on the project. It appears the Government of Malaya is willing to participate in this scheme, and contemplates purchasing the extensive aerodrome at Singapore, while the Siamese Government is anxious that any aerial route between England and Australia shall include Siam. Prince Pitsanoluke has assured Captain Ross Smith that such a service would have the whole-hearted support of his Government. The Dutch East Indian authorities, who are particularly keen on aviation, are already establishing aerial communication throughout their islands, and without the assistance of the Dutch Colonial Government Captain Ross Smith says he would never have reached Darwin.

\- - -

UPON the subject of an England-Australia aerial mail service, Captain Ross Smith has been interviewed by a correspondent of the *Daily Telegraph*. He is of opinion that it would take about fourteen days to deliver a letter in Sydney from the time of posting in London, and that twelve high-powered machines would be required. To attain this result, however, perfect conditions along the whole route would be essential. The first stage from London to Alexandria, which would occupy four days, was the worst, and it would be impossible to maintain a regular service on this section, during the winter months, owing to the tempestuous weather, and at that time of the year it would probably be necessary to convey the mails by the ordinary method to Alexandria.

\- - -

TARANTO would, Captain Ross Smith thinks, be an ideal place for the first landing, and it would then be necessary to tranship the mails to a seaplane, and call at Crete *en route*. At Alexandria the seaplane would be replaced by a land machine, which would undertake the 1,100-mile flight to Basra, via Damascus, where a stop would be made to take petrol aboard. The route across the desert must be surveyed and prominent land marks erected in the shape of white squares or circles at intervals of fifty miles to guide the pilot. At each landmark it would be necessary to erect a small building for the storage of food and water for use in the event of a forced landing. From Basra it was 630 miles to Banda Abbas, where the oil and petrol tanks could be refilled. At the next point, Karachi, 730 miles distant, another change would be made, a land machine replacing the seaplane used on the previous stage.

Thence the route would be via Naisirabad and Allahabad to Calcutta, beyond which it would be better to employ a seaplane as far as Darwin, because most of the country encountered during this stage would be dense jungle or swamp, and emergency landing grounds were scarce, while the construction of aerodromes would be too costly, as it would be necessary in many places to raise the height of the area where the machine would alight by several feet. A seaplane, on the other hand, could utilise innumerable harbours and smaller inlets, all of which provided safe landings.

\- - -

RANGOON would be the next stopping-place, and then came Penang, beyond which it might be desirable to employ a land machine for the run via Singapore to Batavia, the journey to Darwin via Bima Island and Sumbawa being completed by a seaplane. Changing at Darwin to an ordinary aeroplane, the aviator would call at Anthony's Lagoon for petrol, and, substituting a seaplane, would proceed via Cloncurry, Charleville and Narromine. If night flying were introduced this would reduce the journey by four days, but a good system of lighthouses would be necessary to prevent the airman losing his bearings.

\- - -

MORE and more it becomes the conviction of Pole explorers that the aeroplane is to be a huge factor in bringing about success to these great Arctic and Antarctic adventures. In the *Echo de Paris* appears a *résumé* of the views of M. Jean Charcot, the Antarctic explorer, upon this subject, in connection with the British expedition to the South Pole to develop the Antarctic regions commercially, which is being organised under the command of Mr. J. L. Cope in the *Terra Nova* next June. M. Charcot is of opinion that the task by 'plane will not be nearly as onerous as the crossing of the Atlantic by the air. He says:—In 16 hours an aeroplane can cover the thousand miles which hitherto demanded months to accomplish. I well remember, on my return from my second expedition in 1910, the first whaler we met told us of Blériot's crossing the Channel, and at once my companions and myself felt that the conquest of the Pole by air was within tangible reach. In 1912 I met Vedrines at Pau, and he besieged me with questions regarding the South Pole. He had already conceived the idea of attempting to reach it.

\- - -

M. CHARCOT thinks it probable that the British explorers will attack the South Pole like Scott, from Ross Bay. They will, he states, have first to cross an icy plateau of about 500 miles. This barrier passed, they will find themselves before an escarpment, the summit of which, in parts, may surpass 7,800 ft. Then they will have to cross some 375 miles to reach the culminating point of about 10,500 ft. In regard to a non-stop flight out and back, M. Charcot says:—"Of course, that is possible, but the British explorers may, and probably will, prefer to do it by stages. In any case, the expedition, in my opinion, can only yield scientific results if they are able to make a stay at the Pole and fly above it. In this case the discovery will be of the highest interest in all domains of science, magnetic, geographical, aerial, etc. If it is only a case of quickly going and returning, the expedition becomes merely a *tour de force*, admirable assuredly. . . . But the English are too practical to confine themselves to a barren flight."

Landing difficulties, M. Charcot does not think will carry much weight, as the banks of ice are not moving as at the North Pole. The problem of landing on snow, or, still worse, ice, will, he thinks, be solved by adapting broad skis, instead of wheels or floats, to the aeroplane.

DEALING with the same subject, Mr. Cope himself last week stated that he hoped to accomplish the flight on a Blackburn Kangaroo aeroplane on Christmas Day, 1922. Capt. Willard, one of the competitors in the Australian flight, was going with him, and would in all probability act as the pilot. The aeroplane itself was now almost ready. The journey would necessitate the machine climbing to enormous altitudes, for from their base they would have to cross the great ice barrier, which comprised mountains ranging up to 12,000 ft. in height. The great thing they would have to guard against was the constantly arising blizzards, but he hoped that with their instruments they would be able to forecast with some degree of accuracy atmospheric conditions. Mr. Cope admits that it is a very daring scheme, but if human beings could accomplish this feat it would rank as one of the most wonderful in the annals of British aviation. The flight to the Pole would not be attempted merely for show purposes, but in order that they might chart the interior of that vast unknown region. While the expedition will not lose sight of the important question of any possible development of the material resources of the Antarctic region, its objects are essentially scientific and not commercial, except in so far as it is naturally hoped that its scientific results may be applied in a practical manner to the development of such resources.

In order to secure that these objects shall be obtained in the fullest manner possible, it has been decided that all material and data collected by the expedition shall be placed at the disposal of a fully representative committee to be appointed for the purpose of ensuring that these results which will be obtained by means of public subscriptions shall be secured as a national property.

CARRYING a present of Scotch whisky for the Premier of New South Wales from a "firm of distillers" (Advert. tariff on application to the manager) by aeroplane from England to away under, sounds a bit enterprising on somebody's part—and we hope the Premier may get his 30 per cent. under-proof intact; you never know what emergency rations may bring about. Therefore it is not surprising to learn that the flight which started from Hounslow the other day of the two Australian pilots, Lieut. H. Parer and Lieut. J. McIntosh, on their D.H. 9 'plane, is purely a private sporting adventure. Good luck to the plucky voyagers.

FROM information sent by the *Daily Mail* Ottawa correspondent, it appears that the regulations governing flying in Canada for commercial and private purposes adopted by the Government, provide for all registered pilots being subject to the call of the State in time of war.

In order to prevent smuggling between Canada and the United States, all aircraft flying across the frontier are compelled to stop at the border stations for examination.

AMSTERDAM and The Hague are each to have official International Aerodromes, the cost running into £166,000.

IT was a fancy picture of "back to infancy," or even beyond, painted by Maj. H. L. Wimperis, R.A.F., last week during a lecture to juveniles under the auspices of the Royal Aeronautical Society, when, in speaking of the future of aviation and speed, he referred to Rudyard Kipling in "With the Night Mail" having placed the speed in 2,000 A.D. at 240 m.p.h. He, Maj. Wimperis, however, thought we would do better than that, 158 miles an hour having been already achieved by Lieut. Powell. If we increased our speed to 600 miles an hour—the speed of the earth—the sun would appear to stand still in the sky, and if we went faster and started on Monday we should find ourselves back at Sunday. This would not matter much so far as grown-ups were concerned, but the children would get younger and younger until they came to nothing, and then what would happen?

We give it up.

CALLS are made this week for two quite laudable departures now that aviation has been recognised as part of this world's affairs. The one comes from Mr. Fred J. Melville, the well-known philatelist, who backs up a suggestion of Mr. Derek Ingram's for an English aero postage stamp to popularise the aerial post services in this country. Mr. Melville emphasises the point that the postage stamp is an invaluable propagandist, and adds: "There will be an Aero Stamp Exhibition in London next March, and I should be very pleased to offer a small prize, say, £10 10s., to artists and others for the best suggestion for a design for a British aero stamp, the designs to be shown at the Exhibition and adjudged there. If the result be good, the designs could be placed at the disposal of the authorities."

THE other suggestion is from Mr. F. St. B. Gunn, of Coventry Street, who writes asking "that a new air ensign be designed, the flag to be similar to the Naval ensign, but with, say, sky blue as the predominating colour. If such a flag were adopted Britain would have the honour of being the first country to adopt a special ensign for the air.

"Apart from other considerations, it is naturally very galling to the thousands of old R.F.C. men to see the white ensign floating from our airships."

IN this connection it is to be remembered that an Air Force "flag" was duly announced as having been unfurled on one of the S.S. airships when she visited London. It was nothing very striking when seen, and since its single appearance in public it seems to have vanished altogether. There is quite sound common sense in Mr. Gunn's suggestion, and it would be enlightening to hear what the official position is in regard to R.A.F. colours.

OUR lady voters it was pretty certain would sooner or later go one better, when occasion arose, than their precursors, the Suffragettes. They are not content now with picketing No. 10, Downing Street, for the Prime Minister. They prefer to hustle by taking the air to Paris to interview Mr. Lloyd George—and incidentally obtain bold advertisement for their cause—upon the subject of the W.O. clerks' dismissals, rather than wait for his return to London. What if he gives them the slip and, *en route*, they pass him in the same medium?

A Standard Avro Biplane fitted with a 100 h.p. Cosmos "Lucifer" engine, to which reference was made in a recent issue of "Flight."

Personals.

Death

Lieut. C. C. WOOD, the South African airman who was injured while rescuing a woman from drowning, died on January 10 in the R.A.F. Hospital at Finchley. Lieut. Wood was a native of Johannesburg and an engineer on the South African State Railways. Three days after war broke out he joined the South African Horse. He later served in France.

Married

SYDNEY ROBERT GARNAR (late R.A.F.), only son of Mr. and Mrs. Sydney Garnar, of Beckenham, Kent, was married on January 7, at Rushall Church, to ROWENA, youngest daughter of Mr. and Mrs. R. H. HOLDEN, of Rushall, Staffordshire.

Capt. DOUGLAS LAPRAIK, D.F.C., late R.A.F., eldest son of John Douglas Lapraik, was married on January 7 at St. Peter's, Eaton Square, to WINIFRED JULIA DOMVILLE NIX, only daughter of Mr. and Mrs. Harry W. Nix, of Trouville, Lindfield, Sussex.

Maj. GEORGE BANKART TURNER, M.B.E., R.A.F., son of Col. F. M. Turner, R.A., of Guildford, was married on January 7 at Manton Parish Church, to MAY, daughter of Mr. and Mrs. S. N. BANKART, of Manton Grange, Manton.

◈ ◈

The Chicago Show

CHICAGO has led the way in post-War aero exhibitions in America, and from the brief accounts to hand, there appear to be several useful machines, from the commercial point of view, on exhibition. The only British exhibit is an Avro shown by the Inter-Allied Aircraft Corporation of New York. It is in charge of Capt. B. H. Pearson, and was sold immediately the Show opened on January 9 to Miss Nellie Brown Duff, the short story writer.

Eight manufacturers represent the American industry, and they appear to have concentrated on making their machines comfortable to ride in, most of those shown having enclosed cabins with upholstered seats, curtains, etc.

Contrary to what was seen at Paris, there are no very large machines, the biggest being the eight-passenger Curtiss Eagle, of which some details were given in our last issue, while other exhibitors are the Dayton-Wright, the Aero-Marine, the Wright-Martin, and the United Aircraft Corporations. The Goodyear Rubber Co. is the sole representative on the lighter-than-air side with a passenger airship.

Several representatives of South American Republics are visiting Chicago with the avowed intention of investigating the possibilities of aerial mails.

A Martinsyde in Spain and Portugal

ON his return from Spain and Portugal Mr. F. P. Raynham reports that both these countries are backward as regards aviation, and are sadly in need of up-to-date machines. He thinks the peninsula is unsuited for commercial aviation overland, owing to the mountainous nature of the country, the treacherous winds, and the absence of suitable landing grounds. Valuable work could be done, however, in seaplane services between coastal towns, as the train and boat communications are bad. There are many fine harbours suitable for seaplanes and flying-boats.

Mr. Raynham left Brooklands on a standard Martinsyde F 4 single-seater fighting biplane, a machine which broke world records for speed at height and rapid climbing during one period of the War, on October 6, and landed at Vittoria, in the north of Spain, after a stop in France. While in Spain he flew about the country, giving many exhibition flights, and not only was the machine admired for its fine performance and construction, but the skill of Mr. Raynham as a pilot astonished the Spaniards. Mr. Raynham was five weeks at Cuatro Vientos, near Madrid, where he demonstrated the Martinsyde to the Spanish Royal Flying Corps.

ON November 11 he flew to Lisbon, 360 miles in 3 hours 5 mins., despite the fact that he had to do it in the face of a very strong head wind. He had the distinction of being the first aviator to fly into Portugal.

In Portugal the machine created as great an interest and admiration as in Spain, and it was ultimately presented to the Portuguese Government by the British residents of Lisbon, who subscribed the purchase-money. The machine was christened the " Vasco da Gama " by Lady Drummond, and formally handed over by the British Ambassador, Sir Lancelot Carnegie, on behalf of the donors, the machine being received by the Portuguese Minister of War, who represented the Portuguese Republic.

To be Married

The engagement is announced between Lieut.-Col. THOMAS CARTHEW, D.S.O. (late R.F.C.), of the Inner Temple, and EILEEN, eldest daughter of the Right Hon. EDWARD SHORTT, K.C., M.P., and Mrs. Shortt, of 70, Onslow Gardens, S.W.

The marriage arranged between Squadron Leader J. B. GRAHAM, M.C., R.A.F., and LILLIAS, widow of Capt. C. H. BODINGTON, will take place at St. James's, Piccadilly, on Saturday, January 24, at 2.30 p.m.

The marriage arranged between Mr. DOUGLAS PATRICK HADOW, M.C. (late R.A.F.), son of Capt. and Mrs. N. P. M. Hadow, and MONICA, daughter of Canon and Mrs. ALFRED COX, 10, The Avenue, Clifton, will take place at St. James's Church, Sussex Gardens, W., on Thursday, January 29, at 2.30 p.m.

The marriage of Flight-Lieut. RAYMOND WHITAKER, R.A.F., and HILDA MARGARET, daughter of Lieut.-Col. and Mrs. G. E. SHARP, will take place at Salisbury Cathedral on February 11, at 2.15 p.m.

Items

The will of Lieut.-Comdr. NORMAN CARLYLE CRAIG, K.C., Conservative M.P. for the Isle of Thanet since 1910, of Fairfield House, St. Peter's, Thanet, and 10, King's Bench Walk, Temple, chairman of A. Darracq and Co. (1905), who left bequests to servants, has been proved at £16,723.

◈ ◈

H.P. Civilian Flying Record

SINCE the inauguration of civilian aviation in Great Britain on May 1, 1919, until January 8, 1920, the records of the Handley Page commercial aeroplanes are as follows :—

Total number of passengers carried ..	4,029
Total amount of freight carried ..	44,295 lbs.
Total mileage covered	72,243 miles.

The above figures include passenger flights at Cricklewood, London, and in the United Kingdom, and passengers and freight carried on the London, Paris and Brussels air services.

H.P. Paris and Brussels Air Services

ON the London-Paris air service between September 2, 1919, and January 8, 1920, 637 passengers and 16,986 lbs. of goods have been carried ; the total distance covered being 36,440 miles ; 255 passengers and 25,916 lbs. of freight have been carried on the London-Brussels air service during the period extending between September 26, 1919, and January 8, 1920, an aggregate of 26,353 miles having been covered.

Aeronautical Instruments

AT the annual exhibition of the Physical Society of London and the Optical Society at the Imperial College of Science on January 7 and 8, the aeronautic exhibits included a fine collection of captured German instruments, shown by the Air Ministry ; while the Admiralty display included compasses from the Zeppelins L. 33 and L. 48, and the Schutte Lanz No. 11. The Air Ministry collection included several altimeters and petrol level gauges, and liquid oxygen vaporiser complete, an electrically-heated muff, an electrically heated boot, Bosch landing light, Grass and Worff signalling lamp, and various wireless accessories. Messrs. Henry Hughes and Sons also showed a model of an aeroplane cabin specially fitted up to show the possibilities of navigation in the air by means of instruments.

The New " Times " World Atlas

JUDGING by a specimen map which is to hand, it is evident that great care and trouble have been taken to make the new World Atlas, now being issued by *The Times* in fortnightly parts, as complete as is humanly possible. When it is stated that the preparation of the work has been entrusted to the King's Cartographer, Dr. J. G. Bartholomew, of the Edinburgh Geographical Institute, and that he has been backed by the vast technical and intellectual resources behind *The Times*, it will be realised that there could hardly be a better combination for such a work. The atlas does not profess to be a cheap one, but is offered as the best that the world has hitherto seen. This is a high claim, but it is one that *The Times* will probably substantiate. It will be a great thing if British cartography, which too long has lagged behind that of foreign countries, can again give the lead to the world. The fact that His Majesty has allowed the atlas to be dedicated to himself is an earnest of this hope.

FLIGHT

THE VALUE OF SUPERCHARGING

THE following report is based upon a test made in the Altitude Laboratory of the Bureau of Standards to determine the effect produced upon the horse-power output of an aeroplane engine by the introduction of air to the carburettor at a higher pressure than the exhaust or back pressure. Such a condition is easily produced in this laboratory, as the engine under test is enclosed in a chamber, the air pressure in which may be controlled independently of that on the carburettor inlet, by means of suitable pipes and valves leading to the atmosphere and to a suction blower.

A stock 150 h.p. Hispano-Suiza engine, built by the Wright-Martin Aircraft Corporation, New Brunswick, N.J., having a compression ratio of 5·3 to 1, was used in making the tests. The Claudel carburettor, with which the engine was equipped, was adjusted in each case to give maximum power.

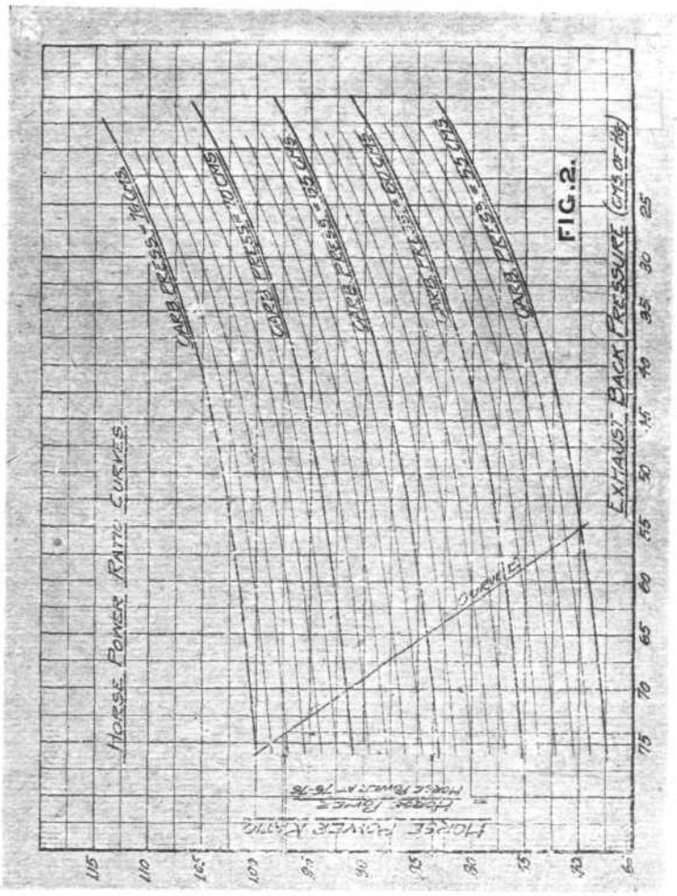
Two runs were made with approximately a constant pressure on the carburettor, and with varying exhaust back pressures in each case. The first run was made with the valve on the intake wide open, so that the highest pressure could be obtained on the carburettor. The pressure within the chamber, which is the same as the exhaust back pressure, was adjusted, and readings taken at values of approximately 62, 50, 38 and 34 cm. Hg. The data obtained are listed in Table I, and the results are plotted as Curve " A " in Fig. 1.

In the second run, the valve on the intake was partially closed, so that the pressure on the carburettor was the equivalent of 20 cm. Hg. below the prevailing atmospheric pressure, and readings taken at approximately the same points as before. The results of this run are given in the second half of Table I, and are plotted as Curve " B " in Fig. 1.

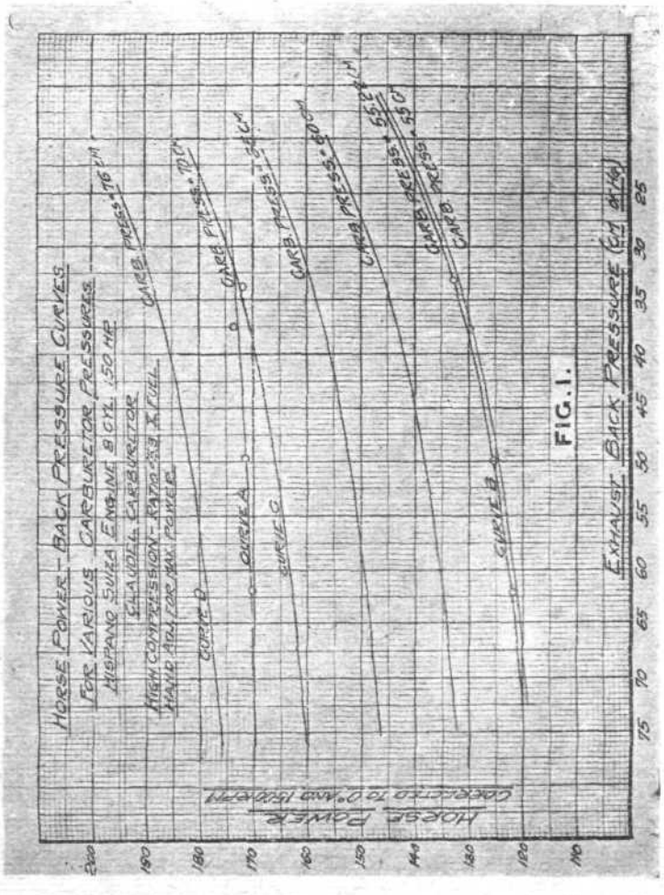
In the first run the pressure of the intake air was not constant throughout, varying from 72·67 to 70·22 cm. Hg., so that it was necessary to correct the results to some constant pressure. The correction was made to a pressure of 70 cm. Hg. by interpolation, which is based on the assumption that the increment of horse-power developed at a given back pressure is proportional to the increment of pressure of the carburettor air. This correction gave Curve " C " in Fig. 1. All horse-powers were corrected to 1500 r.p.m. and 0° C. This temperature correction was made in accordance with the results of a series of tests performed in this laboratory to determine the variation of horse-power with temperature.

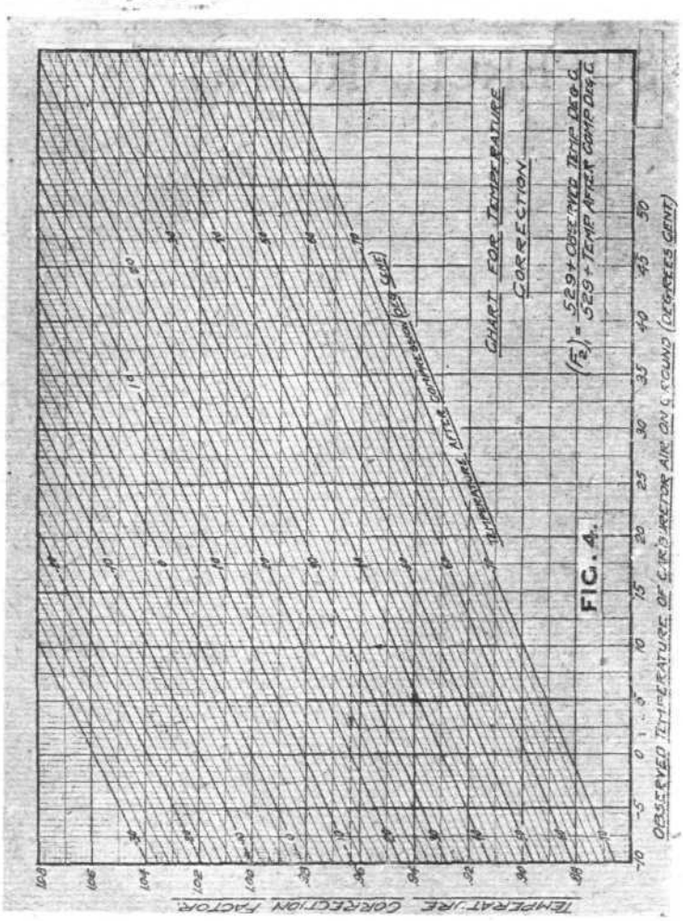
In order to determine the engine performance under different conditions of carburettor pressure and exhaust back pressure, a family of curves at carburettor pressures of 76, 70, 65, 60 and 55 cm. Hg. were plotted against the exhaust back pressures. These were derived from the two experimental curves by interpolation, based on the assumption, as mentioned above.

As it is desirable for purposes of design to know the engine output under different conditions as a function of the maximum output on the ground, the ratio of horse-power taken from the above-mentioned curves to the horse-power at a carburettor and exhaust pressure of 76 cm. Hg., taken from Curve " D," is computed and plotted in Fig. 2. These curves give the engine performance under the different conditions on the basis of a constant temperature of air at the carburettor.



To compute the horse-power that would be developed by an engine equipped with a supercharging device, under a given set of conditions of altitude,





carburettor air pressure and exhaust back pressure, knowing the engine performance on the ground, we may make use of the above-mentioned curves in connection with the following relations :—

$$HP = HP_1 \times R \times (F_2)_1 \qquad (1)$$

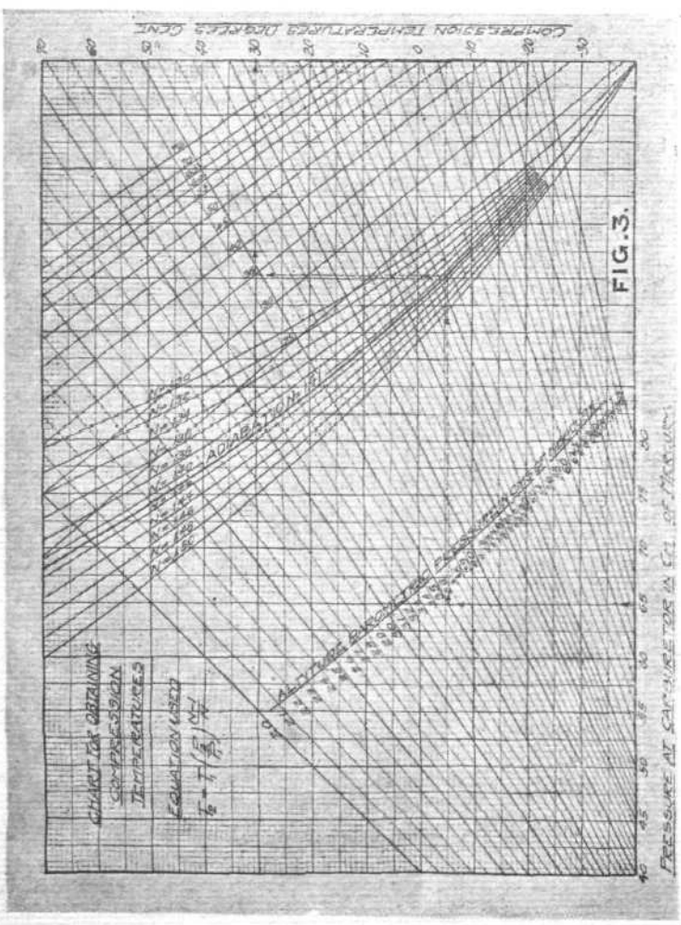
in which HP = horse-power developed with the supercharging apparatus at the given altitude, and HP_1 = the observed horse-power on the ground at the observed carburettor air temperature of t_1, and R = horse-power ratio at the given conditions of exhaust and carburettor pressures produced by the supercharging device at the given altitude (obtained from curves in Fig. 2), and $(F_2)_1$ = temperature correction factor to correct from observed temperature on the ground, t_1, to temperature at the carburettor, t_2, under the given conditions.

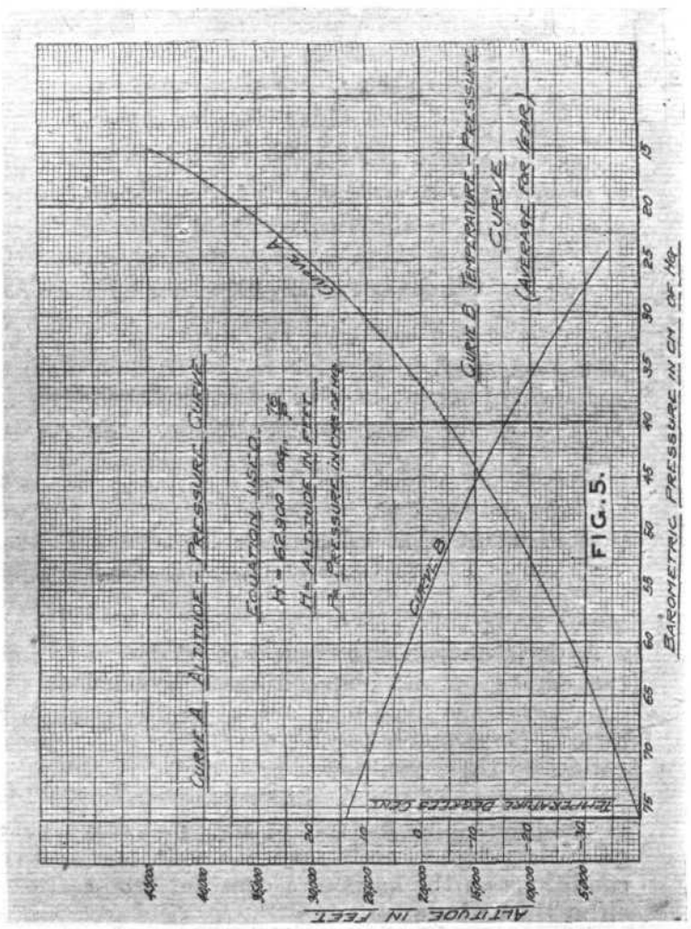
The use of any form of supercharging device involves a compression of the air from the prevailing atmospheric pressure at the given altitude, to some higher pressure, before entering the carburettor. This results in a heating of the air above the prevailing temperature of the atmosphere, and a consequent reduction of the available output of the engine. (For average temperatures of atmosphere at various altitudes, see Curve "B," Fig. 5.) The temperature resulting from such a compression may be computed by the use of the equation :—

$$T_2 = T_1 \left(\frac{P_2}{P_1}\right) \frac{n-1}{n} \qquad (2)$$

in which, T_2 = temperature at carburettor after compression (absolute), and T_1 = temperature of the atmosphere before compression (absolute) ; and P_2 = pressure at the carburettor after compression ; P_1 = atmospheric pressure at the given altitude (pressure before compression) ; and n = the compression exponent (1·41 for an adiabatic compression).

As the air entering the carburettor at the temperature, t_2, after compression (corresponding to the absolute temperature, T_2, of equation 2) is, in most cases, different from the observed temperature on the ground, t_1, the temperature correction factor





$(F_2)_1$ must be included in Equation 1 to give the correct output that would be developed at the existing air temperature at the carburettor under the given conditions.

To facilitate computations charts were constructed in Figs. 3 and 4 for obtaining the temperature after compression, t_2, according to Equation 2, and the temperature correction factor $(F_2)_1$ respectively.

In using the chart for compression temperatures, it is unnecessary to determine the temperature of the altitude, as this is a function of the altitude barometric pressure, and is incorporated into the chart. To use this chart, locate carburettor pressure on the horizontal scale at the bottom, trace vertically upward to the line of barometric pressure corresponding to the given altitude, then horizontally to the curve of the desired compression exponent. From there trace vertically upward or downward to the line corresponding to the barometric pressure of the altitude, and horizontally to the right to the scale of temperatures. This gives the temperature after compression in degrees C.

The temperature correction factor $(F_2)_1$ may be obtained from the chart, Fig. 4. To use this chart, locate the observed temperature on the ground, t_1, on the horizontal scale at the bottom, and trace vertically upward to the line corresponding to the compression temperature as obtained from Chart 4. From there trace horizontally to the line of correction factors.

An example may serve to illustrate the use of the curves and charts. Assume that an engine capable of developing 400 h.p. on the ground at a temperature of 10° C (50° F) is to be equipped with an exhaust pressure turbine blower, which, at a barometric pressure of 35 cm. Hg (corresponding to 21 100 ft. altitude and a temperature of –21° C) (see Curves "A" and "B," Fig. 5) exerts a back pressure on the engine of 35 cm. Hg, and increases the carburettor pressure by 30 cm. Hg. Then we have for the exhaust pressure on the engine at a given altitude, $35 + 35 = 70$ cm. Hg, and for the carburettor pressure we have $35 + 30 = 65$ cm. Hg. From the curves in Fig. 2 we obtain a horse-power ratio of 0·836. To obtain the temperature after compression we may assume an adiabatic compression with an exponent of 1·41, and from the chart, Fig. 3, obtain a temperature, after compression, of 30° C. From the chart, Fig. 4, we obtain the temperature correction factor to correct from 10° C to 30° C, = 0·963. Substituting these values in Equation 1, we obtain for the horse-power at 21 100 ft., with exhaust pressure turbine blower supercharging equipment :—

$$400 \times 0{\cdot}836 \times 0{\cdot}936 = 322 \text{ HP.}$$

If a geared blower were used, then in obtaining the horse-power ratio, the barometric pressure at the given altitude would be used as the back pressure on the engine; and from the available output computed on this basis, the power necessary to drive the blower would be deducted.

If it is desired to include, as a further refinement in the above computations, a correction to the observed horse-power on the ground, HP, for barometric pressure, the output, as computed by Equation 1, may be multiplied by a pressure correction factor obtained from Curve "E," Fig. 2, as follows :—

Locate the intersection of Curve "E" with the curve of carburettor pressure corresponding to the observed barometric pressure on the ground, trace horizontally to the left and read horse-power ratio. The barometric pressure correction factor is 1 divided by this horse-power ratio.

An illustration will serve to make clear the use of this correction factor. Assume that in the above example, the observed horse-power (400) was obtained at an observed barometric pressure of 74 cm. Hg. From Curve "E" we obtain, by the method described above, a pressure correction factor of $\frac{1}{\cdot 972}$ (see Fig. 2) = 1·03. Applying this to the horse-power obtained we get

$$322 \times 1{\cdot}03 = 332 \text{ HP.}$$

TABLE I.—*Table of Data on Test 108 on the Effect of Supercharging*

Barometric pressure, cms. of Hg	61·9	49·7	37·5	33·9
Pressure at carburettor intake (cms. of Hg) ..	72·67	71·42	71·12	70·22
Horse-power corrected to 0° C. and 1,500 r.p.m.	170·2	171·3	173·4	171·8
Lbs. of gasoline per h.p. per hour	·584	·593	·573	·580
Barometric pressure cms. of Hg	33·1	37·7	50·0	62·1
Pressure at carburettor intake (cms. of Hg) ..	55·22	55·22	55·22	55·22
Horse-power corrected to 0° C. and 1,500 r.p.m.	132·9	129·6	125·4	122·0
Lbs. of gasoline per h.p. per hour	·567	·545	·554	·559

Avros Fly Back from Holland

CAPT. W. G. R. HINCHLIFFE and Mr. Shanks have returned to England on their Avros by air from Amsterdam, where winter weather has brought pleasure flying to a natural end. They delayed their departure for a fortnight in the hope of getting a spell of fine weather, but finally had to set out at 8 a.m. on January 2 against a strong head wind. Shanks was flying an Avro five-seater with a cargo comprising 22 two-gallon tins of petrol and seven suit-cases, while Hinchliffe was on an Avro three-seater with Le Rhone engine, his load being one passenger, and two large drums of oil. They kept a straight course from Amsterdam to the Belgian coast, progress being slow owing to the wind, and at 10 a.m. Shanks was forced to land on the coast between Blankenberg and Ostende, for petrol. When they restarted at noon the wind had increased and progress was even slower than before, but they managed to reach Marquise at 1.35 p.m., where they hoped to get petrol and oil. Marquise, however, has been closed down and most of the old landing ground is now ploughed. The O.C. of Marquise, however, seeing how anxious they were to complete their trip, managed to provide them with sufficient fuel to reach Lympne, which took an hour. Bad weather and light forced them to remain there for the night. The total flying time for the whole trip was 6 hours 40 mins. By comparing this with the previous flight of 3 hours 30 mins. for the same journey, one can gain some idea of the fight with the adverse winds.

Describing the journey, Capt. Hinchliffe said :—

"Many points of interest struck us during the journey. At Zeebrugge Mole, we saw the famous *Vindictive*. Work was being carried out on her, and we think that she is being salved. Many wrecks were scattered along the Belgian and French coasts, the result of recent gales. The old battle area of the Western Front is green now, very different from its old brownish war colour. Many of the old Army huts have been converted into dwelling-houses for the natives, and appear to afford excellent homes. Building appears to be going on in many of the wrecked villages, and the signs of war are gradually disappearing."

Films by Air

TOPICAL cinematograph films have been flown from the Continent in Handley Page commercial aeroplanes to enable public events abroad to be shown on the screen in this country within a few hours. It is anticipated that the co-operation of the aeroplane and the cinema will enable films of happenings abroad to be displayed to the public almost as soon as they are dealt with by the newspapers.

THE ROYAL AIR FORCE

London Gazette, January 6

The following officers have been granted short service commns. in the ranks stated, with effect from Jan. 6. They will retain their seniority in the substantive rank last held by them prior to the grant of the short service commn.

In the case of officers now gazetted Flying Officer or Observer Officer, from Pilot Officer, seniority will date from the date of Gazette.

Flight Lieutenants.—D. G. Bourn (T.), J. E. M. Pritchard, O.B.E. (S.O.).

Flying Officers.—W. E. G. Mann, D.F.C. (A.), L. A. Mudge (T.), F. J. Phillips (A.), N. W. Wale (T.).

Observer Officer.—J. A. Hollis (with seniority, Jan. 6).

Flying Officer (from Pilot Officer).—A. E. F. McCreary (Ad.).

Observer Officer (from Pilot Officer).—A. M. Anderson, D.F.C.

The notifications appearing in the *Gazette* of the dates indicated below appointing the following officers to short service commns., are cancelled :—Flying Officer R. H. Bright (T.), Flying Officer W. F. Duff (S.O.), Flying Officer G. W. Lee-Barber (T.) ; Sept. 12, 1919. Flight-Lieut. W. A. Powell (T.), Flying Officer B. C. James (A.), Flying Officer J. S. Stubbs, D.F.C., A.F.C. (A.) ; Oct. 24, 1919. Flying Officer F. G. C. Dickinson (A.) ; Dec. 5, 1919. Flight-Lieut. C. E. M. Pickthorn, M.C. (A.), Flying Officer R. Clelland (T.), Flying Officer F. H. Davies, M.C. (A.), Flying Officer C. E. Howley (A.) ; Dec. 12, 1919.

Permanent Commissions

The classification of Capt. S. N. Cole is (T.), and not (A.), as stated in *Gazette* Aug. 1, 1919.

Lieut.-Col. R. A. Cooper, D.S.O., resigns his permanent commn. in the R.A.F. ; Jan. 6 (the notification which appeared in *Gazette* Aug. 1, 1919, is hereby cancelled).

The following temporary appointments are made at the Air Ministry :—

Staff Officer, 2nd Class.—(Q.).—Sqdn. Leader H. A. R. Aubrey, O.B.E., M.C. ; Dec. 30, 1919, from S.O., 1st Class.

Staff Officer, 3rd Class.—(Air)—Flight Lieut. B. P. Chase ; May 1, 1919.

The following temporary appointments are made :—

Staff Officers, 3rd Class.—(P.)—Flying Officer A. H. Goldie ; Dec. 3, 1919. (Q.)—Sec. Lieut. (Hon. Lieut.) P. J. Burns, M.B.E. ; Dec. 21, 1918, to May 18, 1919, and to be actg. Capt. whilst so employed till April 30, 1919.

Flying Branch

Sec. Lieut. T. Lund (since re-classified T.) to be Lieut. ; Nov. 4, 1918.

Pilot Officers to be Flying Officers :—A. Shepherd (since demobilised) ; Sept. 10, 1919. S. K. Barnes ; Sept. 11, 1919. J. Cranfield ; Oct. 12, 1919. W. R. H. Gateshill ; Oct. 15, 1919. M. H. Steff ; Oct. 18, 1919. R. S. L. Levi ; Nov. 3, 1919.

The following Cadets are granted temp. commns. as Sec. Lieuts. (A.) :—E. P. Smith ; Sept. 26, 1918. A. W. Pequegnat ; Oct. 17, 1918.

The following relinquish their temp. R.A.F. commns. on return to Army duty :—Pilot Officer (Hon. Flying Officer) J. H. MacMillan (Lieut., E. Ont. R.) ; March 16, 1919. Flying Officer (Hon. Flight-Lieut.) W. Morrice (Capt. Queen's Own. R., Glasg. Dgns., T.F.) ; April 24, 1918. Flying Officer H. S. Clemons (Lieut., R.A.S.C., R. of O.) ; May 27, 1919. Flying Officer E. D. Fanshawe (Capt., Dgn. Gds.) ; Sept. 2, 1919. Flying Officer G. H. Dykes (Lieut., Lanc. Fus.) ; Flying Officer W. N. Sherlock (Lieut., Sea. Highrs.) ; Nov. 18, 1919. Flying Officer E. S. Garner (Lieut., Manch. R.) ; Dec. 16, 1919. Flying Officer H. Puckle, D.F.C. (Lieut., Leic. R.) ; Jan. 4.

Flight-Lieut. J. B. Walmsley, D.F.C. (Lieut., Ind. Army), relinquishes his commn. on reversion to I.F.R.O. ; Dec. 18, 1919.

Sec. Lieut. T. Sydenham relinquishes his commn. on ceasing to be employed, and is permitted to retain his rank ; June 3, 1919.

(Then follow the names of 81 officers who are transfd. to the Unemployed List under various dates.)

Maj. W. D. S. Sanday, D.S.O., M.C., relinquishes his commn. on account of ill-health contracted on active service, and is granted the rank of Lieut.-Col., Dec. 30, 1919.

Capt. H. H. Kitchener (Capt., R.E.) relinquishes his R.A.F. commn. on resigning from the Army ; Jan. 4.

The following relinquish their commns. on account of ill-health, and are permitted to retain their rank :—Lieut. B. S. Crecine (contracted on active service) ; Dec. 22, 1919. Lieut. D. A. R. Chapman, A.F.C. (Sec. Lieut. Extra Reg. Employed List) ; Jan. 1. Lieut. W. F. Booth ; Jan. 7.

Lieut. H. L. Yates resigns his commn. ; June 10, 1919 (substituted for notification in *Gazette* May 13, 1919).

The following Sec. Lieuts. relinquish their commns. on account of ill-health (contracted on active service), and are permitted to retain their rank :—C. S. Gregg ; Nov. 19, 1919. C. T. Dempsey, J. I. Sanderson ; Dec. 30, 1919.

The notification in *Gazette* Dec. 24, 1918, concerning Lieut. J. M. Dowsett is cancelled.

Administrative Branch

Capt. D. S. R. Kent to be Capt., from (A'ship) ; July 3, 1919.

Flight-Lieut. F. G. Sheriff relinquishes the grading for pay and allowances of S.O. 2 (2nd Grade) ; Dec. 27, 1919.

Flying Officer G. M. Long is graded for purposes of pay and allowances as Flight-Lieut. while employed as Flight-Lieut. from Sept. 9, 1919, to Nov. 23, 1919.

Lieut. C. P. V. Roche to be Lieut., from (A.) ; June 14, 1919.

Sec. Lieut. F. F. Anslow to be Lieut. ; May 4, 1919.

Pilot Officers to be Flying Officers :—A. E. Boyce ; Aug. 21, 1919. N. J. P. Revington ; Nov. 5, 1919.

Pilot Officer D. S. G. Burton is graded for purposes of pay and allowances as Flying Officer while employed as Flying Officer ; Sept. 29, 1919.

Pilot Officer C. D. Insall to be Pilot Officer, from (A'ship) ; Sept. 12, 1919.

Flight-Lieut. H. E. Talbot (Capt., 11th Hrs.) relinquishes his temp. R.A.F. commn. on return to Army duty ; Dec. 19, 1919.

Lieut. C. A. Styles relinquishes his commn. on ceasing to be employed, and is permitted to retain his rank ; Feb. 3, 1919.

(Then follow the names of 25 officers who are transfd. to the Unemployed List under various dates.)

Lieut. E. H. McEnery, M.C., relinquishes his commn. on account of ill-health, and is permitted to retain his rank ; Dec. 5, 1919 (substituted for notification in *Gazette* Dec. 12, 1919).

The initials of Lieut. H. E. Storey are as now described, and not as stated in *Gazette* July 22, 1919.

The notification in *Gazette* of Nov. 28, 1919, concerning Lieut. J. Woolfenden is cancelled.

The notification in *Gazette* of Dec. 5, 1919, concerning Capt. A. Toomey is cancelled.

Technical Branch

Flying Officer (Hon. Flight-Lieut.) J. Ramsay, M.C., relinquishes the grading for pay and allowances as Flight-Lieut. on ceasing to be employed as Flight-Lieut., Grade (B.) ; Oct. 1, 1919.

Sec. Lieut. A. C. Hayes to be Lieut., Grade (A.) ; June 3, 1919.

Sec. Lieut. (Hon. Lieut.) S. E. Neal to be Lieut. ; April 2, 1918.

Sec. Lieut. (actg. Lieut.) A. M. Cawthra (Sec. Lieut., Extra Reg. Employed List) relinquishes his R.A.F. commn. on retirement from the Army, and is permitted to retain rank of Lieut. ; Jan. 11, 1919.

(Then follow the names of 37 officers who are transfd. to the Unemployed List under various dates.)

Lieut. C. Rawdon-Schofield relinquishes his commn. on account of ill-health, and is permitted to retain his rank ; Aug. 7, 1919 (substituted for notification in *Gazette* Aug. 19, 1919.)

The surname of Sec. Lieut. (Hon. Lieut.) C. N. Dore is as now described and not as stated in *Gazette* Jan. 28, 1919.

The notification in *Gazette* Jan. 31, 1919, concerning Sec. Lieut. A. M. Cawthra is cancelled.

(Then follow the names of seven officers who are transfd. to the Unemployed List under various dates.)

Memoranda

Sec. Lieut. (Hon. Lieut) J. J. Galvin to be Hon. Capt. ; July 14, 1918.

The following relinquish their commns. on account of ill-health, and are permitted to retain their ranks :—Capt. W. J. J. E. M. Everard (Capt., Irish Gds., S.R.) (contracted on active service) ; Dec. 20, 1919. Capt. W. A. Lawrence ; Dec. 30, 1919.

The notification in *Gazette* of July 15, 1919, concerning 184419 Cdt. G. Geddes is cancelled.

London Gazette, January 9

Permanent Commissions

Lieut.-Col. R. A. Cooper, D.S.O., resigns his permanent commn. in R.A.F. Jan. 6.

The classification of Lieut. J. H. Green is (A. and S.) and not (P.), as stated in *Gazette* of Aug. 1, 1919.

The initials of Maj. F. J. Roberts (A.) are as now described, and not E. J. as stated in *Gazette* of Sept. 16, 1919.

The notification in *Gazette* of Aug. 22, 1919, appointing Capt. G. T. R. Hill (A.) to a permanent commn. is cancelled.

The notification in *Gazette* of Aug. 1, 1919, appointing Capt. G. Somers-Clarke (T.) to a permanent commn. is cancelled.

The notification in *Gazette* of Jan. 6 concerning Lieut.-Col. R. A. Cooper D.S.O., is cancelled.

The following temporary appointment is made :—

Staff Officer, 2nd Class.—(Air.)—Flight-Lieut. N. H. Bottomley, A.F.C. Nov. 25, 1919.

Flying Branch.—Flying Officer A. H. Goldie to be Flying Officer (A. and S.) from (S.O.) ; Oct. 18, 1919. Sec. Lieut. A. S. Poynton to be Lieut. ; May 3, 1918. Sec. Lieut. E. L. Doncaster (late Gen. List, R.F.C., on prob.) is confirmed in the rank of Sec. Lieut. (O.) ; Aug. 8, 1918 (since killed). Lieut. H. S. Green (Lieut., I.A.R.O.) (and late R.A.F.) is granted a temp. commn. as Lieut. (O.) ; May 20, 1919. Capt. E. F. Nichol, M.C. (late W. Lan. R.), is granted a temp. commn. as Sec. Lieut. (A.), and to be Hon. Capt. ; Aug. 17, 1918 (since killed).

The following relinquish their temp. R.A.F. commns. on return to Army duty :—Pilot Officer F. Hill (Lieut., Dur. L.I.) ; July 31, 1918 (substituted for notification in *Gazette* of Dec. 30, 1918). Pilot Officer (Hon. Flying Officer) A. C. McKinnon (Lieut., Canadians) ; Dec. 10, 1918. Flying Officer P. V. C. Low (Lieut, Black Watch) ; Feb. 3, 1919. Flight-Lieut. T. M. B. Newton (Lieut., R. Berks. R.) ; Nov. 27, 1919. Flying Officer E. G. Birbeck, M.C. (Lieut., N. Staffs. R.) ; Dec. 2, 1919. Flying Officer J. T. M. Tylden-Wright (Lieut., Hrs.) ; Dec. 8, 1919. Flight-Lieut. G. E. Gordon-Duff (Lieut., Cam. Highrs.) ; Dec. 16, 1919. Flight-Lieut. E. E. N. Burney, M.C. (Capt., R. Berks. R.) ; Flight-Lieut. E. P. Roberts, M.C., D.C.M. (Lieut. R. Suss. R.) ; Dec. 19, 1919. Flying Officer N. E. Wallace (Lieut., Can. F. Art.) ; Dec. 20, 1919.

Flying Officer C. G. Barker (Lieut., 8th Gurkhas), relinquishes his temp. R.A.F. commn. on reversion to (I.A.R.O.) ; Oct. 25, 1919).

(Then follow the names of 80 officers who are transfd. to the Unemployed List under various dates.)

Capt. J. L. Williams relinquishes his commn. on account of ill-health caused by wounds), and is permitted to retain his rank ; Jan. 3.

Capt. G. S. Creed (Lieut., S.A.D.F.) relinquishes his commn. on account of ill-health ; Dec. 7, 1919 (substituted for notification in *Gazette* Sept. 12, 1919).

The following relinquish their commns. on account of ill-health contracted on active service, and are permitted to retain their rank :—Lieut. J. C. Orr ; Jan. 1. Lieut. T. N. O'Galligan ; Jan. 3. Sec. Lieut. R. C. S. Hall, Sec. Lieut. J. R. Lofthouse ; Jan. 2.

The initials of Sec. Lieut. R. G. K. Baker are as now described, and not as stated in *Gazette* April 18, 1919.

The initials of Capt. W. A. Davies are as now described, and not as stated in *Gazette* Nov. 25, 1919.

The surname of Lieut. R. U. Hoddinott is as now described, and not as stated in *Gazette* Dec. 9, 1919.

The notification in *Gazette* Dec. 31, 1918, concerning Sec. Lieut. T. C. Stuart is cancelled.

The notification in *Gazette* April 11, 1919, concerning Sec. Lieut. A. H. Aitken is cancelled.

The notification in *Gazette* July 22, 1919, concerning Lieut. J. D. Patterson is cancelled.

The notification in *Gazette* July 29, 1919, concerning Lieut. W. A. Hunter is cancelled.

The notification in *Gazette* Nov. 7, 1919, concerning Lieut. R. A. Curry is cancelled.

Administrative Branch

Pilot Officers (actg. Flight-Lieuts.) to be Flying Officers, and to retain the actg. rank of Flight-Lieut. whilst employed as Flight-Lieut. :—A. E. M. Fortescue, E. S. Peters ; Dec. 10, 1919. Sec. Lieut. C. Stelfox (since demobilised) to be Lieut. ; July 16, 1919.

Sec. Lieut. W. M. Everett (late Gen. List, R.F.C., on prob.) is confirmed in rank as Sec. Lieut. ; Dec. 1, 1918).

The following relinquish their temp. R.A.F. commns. on return to Army duty :—Flying Officer G. M. Long (Lieut., actg. Capt., Durh. L.I.) ; Nov. 24, 1919. Flying Officer L. B. Nicholls (Lieut., R.A.S.C.) ; Dec. 30, 1919.

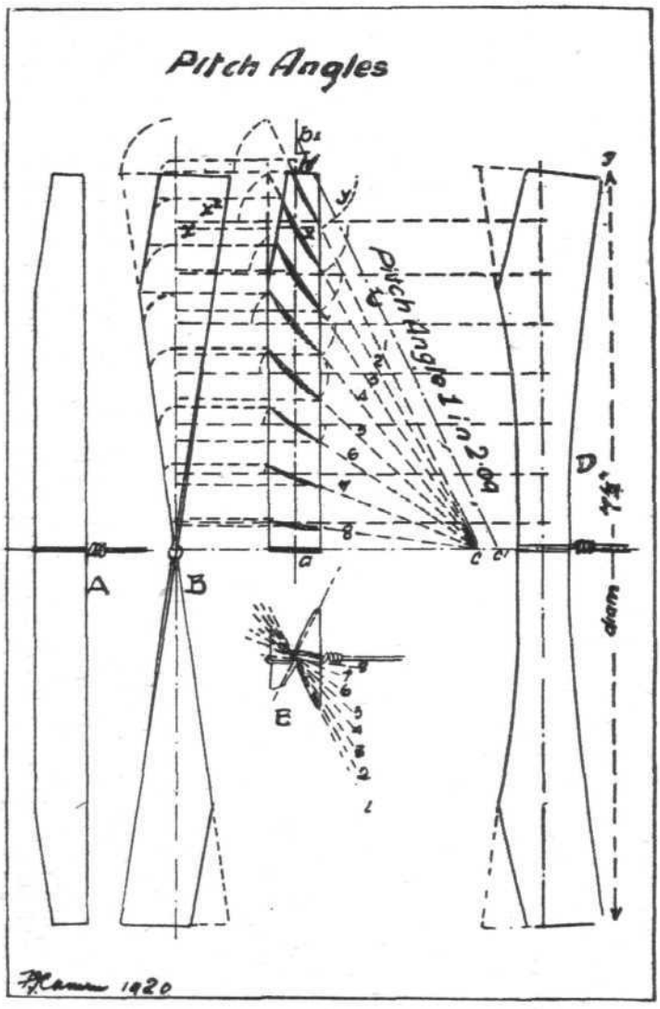
(Then follow the names of 19 officers who are transfd. to the Unemployed List under various dates.)

The following Lieuts. relinquish their commns. on account of ill-health (contracted on active service), and are permitted to retain their rank :—K. L. Mackenzie ; Nov. 29, 1919. J. A. Radcliffe ; Jan. 1.

NOTE.—*All communications should be addressed to the Model Editor.*

Airscrews Further Considered.

A CORRESPONDENT asks me to deal more fully with the question of airscrews, and accordingly I show a drawing of the complete method of setting out an airscrew. This method applies, with modifications to full-sized airscrews as well as model ones, and although the drawing may present an engineering aspect, it is in reality quite simple. Let us go carefully over the drawing. A shows a side elevation of a bentwood screw, and B a front elevation. C is a portion of a side elevation with the pitch angle at eight different points plotted, whilst D is a plan of the blank of wood which is to



form the finished screw. E is an end view of the finished screw, with the pitch angles also plotted.

The drawing C is first made, drawing the axial lines passing through *a* and *c*. Next erect a line at right angles as *ab*, representing the centre line of the blades. On each side of *a* mark the width of the blank at the centre, and mark off the distance *b* equal to half the diameter. Having determined the pitch angle—say 1 in 2·09, when the pitch of the screw will be 1⅛ times the diameter—and set off a distance *ab*, which is equal to the circumference of the circle swept by the screw = 3⅐ + diameter, we mark off the pitch along the line *ac*, thus locating point *c*1. By connecting *b*1 to *c*1 determines the pitch angle; parallel to this line draw another line cutting through *b*, thus locating point *c*. By subdividing the line *ab* into a number of equal parts (in this case eight) and connecting the points so obtained with *c*, gives us the pitch angles at those points. Two or three points only would be sufficient for model screws, but it follows that the greater the number of angles taken the more efficient will be the screw. The angles may now be projected to the front elevation B, and the lines *x*, *x*1, and the radii *x*2 show how this may be done.

(To be continued.)

Correspondence

We have received the following from Mr. J. C. Balden of the Scottish Aeronautical Society:

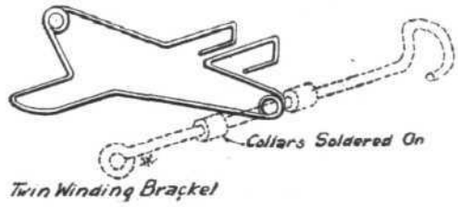
"Being a constant reader of FLIGHT and your interesting notes on model aeroplanes, I am writing you regarding your article entitled 'Calculating Areas.'

"In the example you give you mention that the distance from the C.G. of the machine to the C.P. of the main plane is 5.

"Is this the most efficient distance in this case? How does one arrive at it by calculation, and what difference does it make by increasing or decreasing this distance beyond the fact that it alters the size of the elevator? Does it affect the longitudinal stability or duration?

"Again you state that the angle of incidence of the elevator should be nearly twice that of the main plane. What is the most efficient angle of incidence to give a main plane of the canard-type of model? Should it differ in relation to the size and weight of the model, and how can it be calculated?

"Referring to your twin winding arrangement for the nose of a model, I enclose a sample of the article I have used with



Twin Winding Bracket

success on my models. I think the single bearing is an improvement, and find it works excellently with what was originally known as Bonn's twin-geared winder, which was on the market in pre-War days.—JAMES C. BALDEN.

[In the example given 5 in. represents an arbitrary distance for purposes of illustration. The most efficient distance of the C.G. is, with an ordinary rectilinear wing, just forward of the main surface. The ratio of areas in canard models should be in the neighbourhood of 10 to 1, and with tractors about 7 to 1. The C.P. of the main plane should not be too far behind the C.G., otherwise the elevator will be called upon to carry more than its portion of the load—meaning a corresponding increase in its angle of incidence. The early Wright machines afford an example of wrongly disposed surfaces, since they flew with a *negative* angle on the elevator. The position of the C.G. can be calculated, but it is a tedious process, involving weights, datum lines and lengths. It is usually not wise to use a greater angle than 2° on the main-plane. Indeed, many of my models have flown most efficiently when the plane has been flat on the spar! The angle cannot be calculated.—MODEL. ED.]

A Model Aero Club for Herts?

A Watford reader writes:—

"I am very pleased to see a revival of model aviation in FLIGHT, as I have been interested in the subject for two or three years, and am at present engaged on my fifty-second model.

"I should be pleased to enter for any competition you organise, and know several others who would enter models.

"During the last few years several of us in this district formed the West Herts Model Aero Club, but owing to the War it was not very successful. However, I believe it would now be easier to make it so. Perhaps a note in your columns would remind enthusiasts in this district that they might combine."

SIDE-WINDS

TO MEET the needs of the increasing numbers of their Irish customers Messrs. Barimar, Ltd., of 10, Poland Street, Oxford Street, London, W. 1, have now opened branch works with head offices at 185, Great Brunswick Street, Dublin. Barimar (Ireland), Ltd., are working in close association with the parent company in London, and a large number of Irish orders have already been received. British welding experts who have long worked in Barimar's London factories have gone over to Dublin, and every known effective welding process will be brought into use, so that repairs of any description will be dealt with suitably. The latest welding plants have been installed, and there are fully-equipped machine-shops that are so essential to meet the needs of customers who desire, with the minimum delay, to put back into use fractured parts that have been re-created. Additional Barimar branches are already arranged for, and are in course of formation, in France, Australia (3), New Zealand, Delhi, Calcutta, Bombay, Madras, Karachi, Burma, Ceylon, South and East Africa, Denmark, Norway and Sweden.

\- - -

A LIST of new lines now sold by Messrs. Brown Brothers, Ltd., of Great Eastern Street, E.C.2, contains several items of considerable interest to motorists. Those who have trouble in starting their cars in cold weather should note the "Quick-Start" vaporiser, a device which utilises the heat from an electric lamp to warm the air entering the carburettor. Another line specially useful at this time of the year is "Puralite," a substance which is claimed to prevent rain, frost, snow or sleet from adhering to the windscreen.

\- - -

THE recent severe weather resulted in bad frost fractures to thousands of motor cylinders and radiators, and Barimar, Ltd., the scientific welding engineers of 10, Poland Street, London, W. 1, found it necessary to make special arrangements for the instantaneous treatment of these parts by one of their special processes, with the result that many owners were able to have their cars back in commission within about 24 hours.

\- - -

MESSRS. ACCLES AND POLLOCK, LTD., of Oldbury, are receiving enquiries from several of their friends as to whether or not they have made any change with respect to their representation in Australasia. The present representatives on the spot are Messrs. Kemsley and Co. (Proprietary), Ltd., but the suggestion is made that a private individual has been appointed, and that the firm named has been deposed. It would almost appear as though someone representing himself to be a gentleman has gone a little beyond the usual limit laid down by commercial travellers, and has given voice to a decided untruth. It is rather remarkable to learn that it is reported of the same individual that he and the Americans are going to do all the business with Australia that is to be done. Our friends, Messrs, Accles and Pollock, Ltd., while giving the Asquithian advice to "wait and see," will themselves remain active as before in the pursuit of their business.

\- - -

MRS. ATKEY, the lady who is learning to fly on an Avro at Hounslow, has now completed her course of dual flying, and a few days ago made her first solo flight. It is hoped that she will soon pass the tests for her "ticket."

\- - -

THE machine which was flown by Capt. Wrigley, of the Australian Air Force, accompanied by Sergt. Murphy, from Melbourne to Port Darwin to meet Capt. Sir Ross Smith, was a B.E. 2E, with 90 h.p. R.A.F. engine. It was constructed in 1915 at the works of the British and Colonial Aeroplane Co., Ltd., at Filton, the home of the famous "Bristol" aeroplanes, and has been in more or less constant operation since that time. It was the first time Australia has been flown across, and the machine for the journey of 2,500 miles was in the air for 46 hours.

▣ ▣ ▣ ▣

A Carburettor Claim

THE Royal Commission on awards to inventors, Mr. Justice Sargant presiding, on January 12, heard a claim by Messrs. H. M. Hobson, Ltd., in respect of carburettors.

Mr. Bevan, K.C., counsel for the applicants, said the claim was in respect of royalties upon a large number of carburettors made under letters patent owned by that company. The claim fell under two heads—the first in respect of royalties upon carburettors made by the applicant company itself upon agreed terms which excluded royalties. The other branch of the claim was in respect of carburettors made, by arrangement, by other firms.

PUBLICATIONS RECEIVED

Report No. 31. Development of Air Speed Nozzles. Report No. 36. The Structure of Airplane Fabrics.—National Advisory Committee for Aeronautics, Washington, D.C., U.S.A.

Limited Liability Companies. By Joseph Morgan. Alan Martin, Morgan and Co., Ltd., 10, Lower John Street, Regent Street, W.1. Price 1s. net.

Catalogues

"Exide" and "Clifton" Portable Accumulators. The Chloride Electrical Storage Co., Ltd., Clifton Junction, Manchester.

Bibliotheca Aeronautica: With Illustrations. Maggs Bros., 34-35, Conduit Street, New Bond Street, W.1.

▣ ▣ ▣ ▣

COMPANY MATTERS

Handley Page, Ltd.

DIVIDEND at the rate of 7 per cent. per annum, less tax, on the preference shares, payable on February 9, is announced. This dividend covers the period from April 22 to December 31.

NEW COMPANY REGISTERED

OLYMPIA AEROS AND AUTOS, LTD.—Capital £10,000, in £1 shares. First directors: J. Bagg and S. C. Bagg. Solicitors: Goodman, Saunders, Squires and Co., 21, St. Helen's Place, E.C.

▣ ▣ ▣ ▣

AERONAUTICAL PATENTS PUBLISHED

Abbreviations:—cyl. = cylinder; I.C. = internal combustion; m. = motors

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published January 15, 1920

7,994. C. J. H. M. KENNEDY and G. C. MCLAUGHLIN. Aircraft control mechanism. (136,582.)
16,877. J. WHITEHEAD and W. H. CORLETT. Reversible rotary engines. (136,590.)
18,469. F. E. DADD. Floats for hydroplanes and other aircraft. (136,591.)
21,108. S. C. MOTE and A. P. CROUCH. Rubber-covered tanks for inflammable liquids. (136,635.)
21,141. BOULTON AND PAUL and J. D. NORTH. Spars for aircraft. (136,638).
21,183. H. LARK and W. H. NEVELL. Combined cushions and lifebelts. (136,639.)
21,544. T. DOUGLAS. Stop-gear for aero engines. (121,951.)

APPLIED FOR IN 1919

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published January 8, 1920.

2,335. BLACKBURN AEROPLANE AND MOTOR CO., H. BOOTH AND F. A. WILKINSON. Landing-chassis. (136,361.)
3,056. H. MERCIER. Pressure devices for motors intended to work at, different altitudes. (123,309.)
7,438. BLACKBURN AEROPLANE AND MOTOR CO., AND H. BOOTH. Fuselages, hulls, etc. (136,426.)
16,417. F. H. F. BARATTE. Aeroplane tail-supporting carriages. (129,276.)

Published January 15, 1920

13,563. F. W. FULTON. Maps and charts for air, etc., transport. (136,760.)
13,767. J. A. ARMSTRONG. Parachutes. (136,764.)

NOTICE TO ADVERTISERS

All Advertisement Copy and Blocks must be delivered at the Offices of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT

The Aircraft Engineer and Airships

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.

Telegraphic address: Truditur, Westcent, London.
Telephone: Gerrard 1828.

SUBSCRIPTION RATES

"FLIGHT" will be forwarded, post free, at the following rates:—

UNITED KINGDOM	s.	d.	ABROAD*	s.	d.
3 Months, Post Free..	7	1	3 Months, Post Free..	8	3
6 ,, ,, ..	14	1	6 ,, ,, ..	16	6
12 ,, ,, ..	28	2	12 ,, ,, ..	33	0

These rates are subject to any alteration found necessary under war conditions.

* *European subscriptions must be remitted in British currency.*

Cheques and Post Office Orders should be made payable to the Proprietors of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.